PETRA

Professional Engineers Traffic Reporting & Analysis

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1-215-491-4889

or via e-mail at:

support@jamartech.com

For more information on our products, the latest news in product development, and to download software updates, visit our web site at:

www.jamartech.com

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

www.jamartech.com/petrawindowssupport.htm

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Introduction and Installation

Introduction & Installation

What is PETRA?

PETRA, which stands for Professional Engineers Traffic Reporting and Analysis, is a JAMAR Technologies software program designed for analyzing data collected with a JAMAR hand-held data collector. The program was originally developed in the early 1990s and this current version, for the Windows operating system (95 or higher) contains many new features based on feedback from users of earlier versions.

The program was developed with today's practicing engineer in mind, with emphasis placed on ease of use while maintaining powerful capabilities. PETRA 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, Chapter 4 of this manual provides an in-depth tutorial on all of the essential aspects of the program needed to start downloading your data and producing reports.

Minimum Computer Requirements

- Windows 95, 98, NT, 2000, ME or XP.
- 32 Megabytes of RAM.
- 20 Megabytes of free space on your hard disk.
- CD-ROM (to install the software only)
- Available Serial Port for downloading data

Supported Studies

PETRA for Windows is sold in a modular format, which means that you only need purchase the parts of the program you use. The base version of the program is for Turning Movement studies. Other modules that can then be purchased for use with this are Classification, Gap, Signalized Intersection Delay, Stop Sign Delay, Spot Speed and Saturation Flow. Which modules you have access to depends on which were purchased with your copy of the program.

Supported Data Collectors

PETRA reads data from the JAMAR line of hand-held data collectors, including the DB-100, DB-400, TDC-8 and TDC-12. The program also supports the previous versions of these boards, the IMC-IV and IMC-4.

Software Updates

Updated versions of JAMAR software are released periodically and are posted on the JAMAR web site. Licensed owners of PETRA 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 PETRA, go to **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 PETRA support web page at: **www/jamartech.com/petrawindowssupport.htm**.

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 data that has been collected at an intersection where the direction of a vehicle (left, through, right) that passes through the intersection is recorded.

Classification — This is 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 — This stands for data that is collected to determine delay information at an intersection controlled by a traffic signal.

Stop Sign Delay – This stands for data that is collected to determine delay information at an intersection controlled by a stop sign.

Spot Speed — This is 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 — This is 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.

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 — This stands for any data that is collected using the unshifted, Bank 1 and Bank 2 keys of a data collector (DB-400, TDC-8 or TDC-12). Commonly used groups are passenger cars (unshifted), light trucks (Bank 1), and heavy trucks (Bank 2).

Installing PETRA

Begin the installation by placing the PETRA 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:\setup' where X is the letter of your CD-ROM drive. Press OK and you will see the Installation Options for the program.

The Installation Options allow you to do a number of things in addition to installing the program. You can view a copy of this manual, register your copy of the software and check out some other JAMAR products. To begin installing the program, click on **Install PETRA for Windows**.

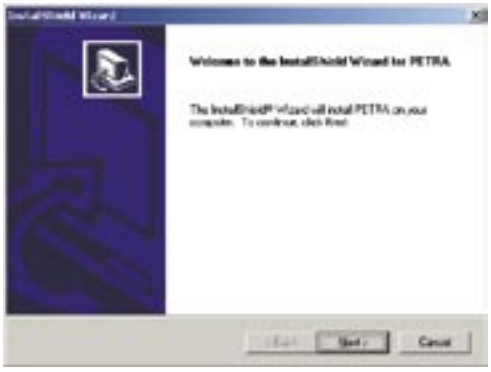

Figure 1-1: Welcome Screen

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.

Figure 1-2: License Screen

The License Agreement screen allows you to review the software license for the program. PETRA is site licensed, which means you can install the program on as many computers as you like as long as they are at the same location. 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.

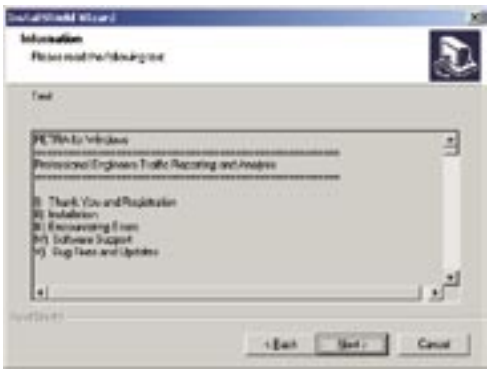

Figure 1-3: Information Screen

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.

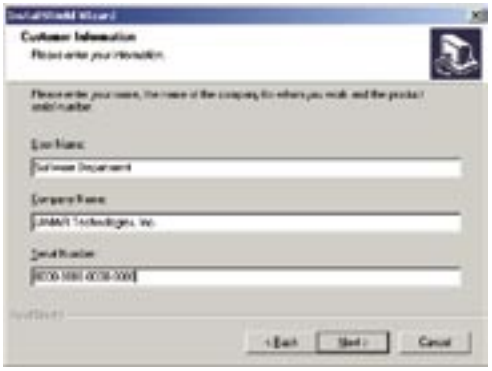

Figure 1-4: Customer Information Screen

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.

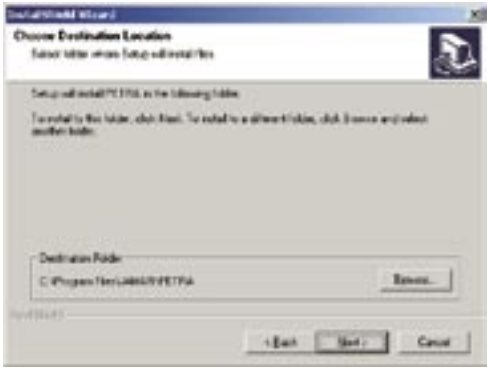

Figure 1-5: Destination Location Screen

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

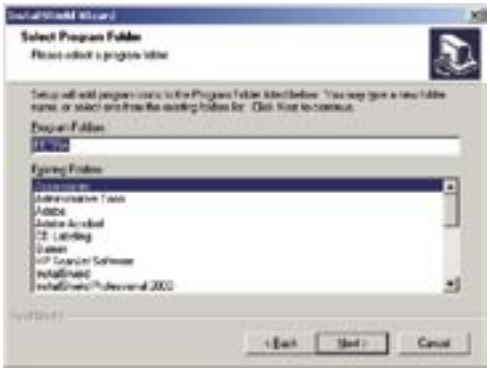

Figure 1-6: Program Folder Screen

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

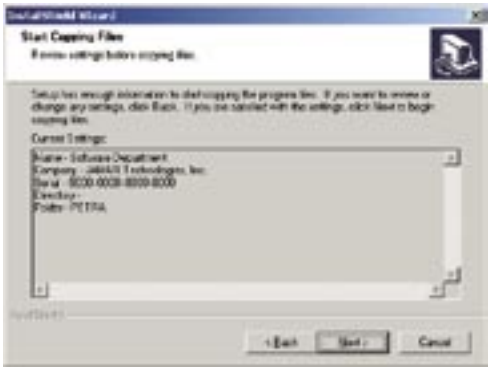

Figure 1-7: Start Copying Files Screen

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.

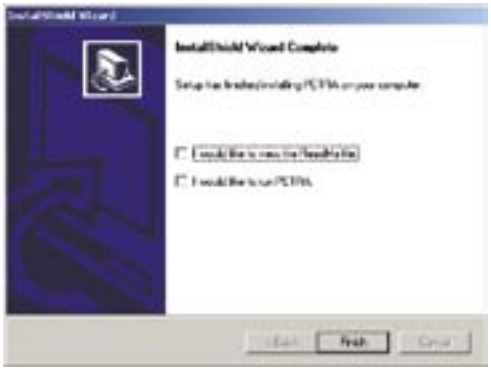

Figure 1-8: Installation Complete Screen

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 PETRA.

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

Running PETRA

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 PETRA.exe file, which is probably in the *C:\Program Files\Jamar\PETRA* folder. Double click on the file **PETRA.exe** and the program will run.

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

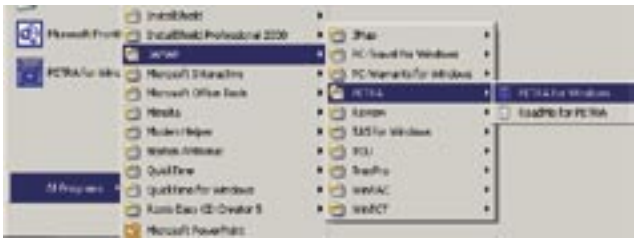

Figure 1-9: Start-up Selection

Navigating in PETRA and Using the Help System

Navigating in PETRA

PETRA 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

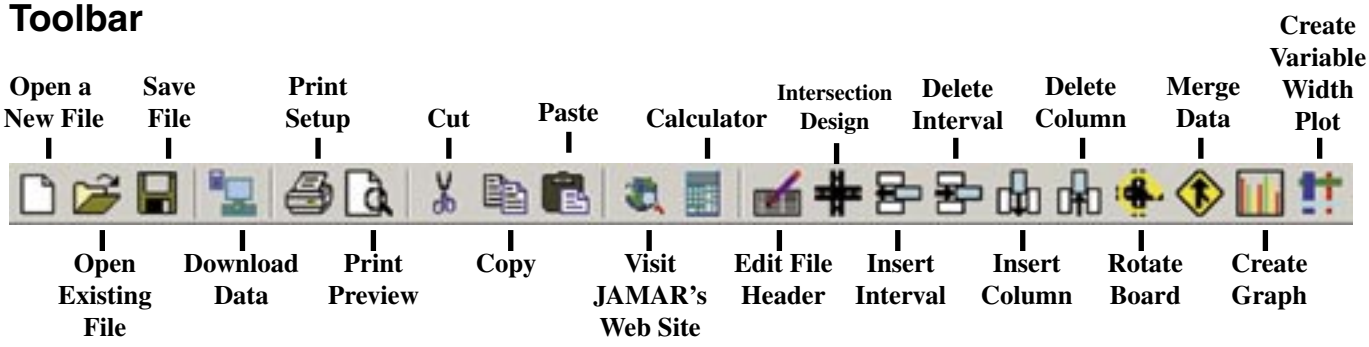

Figure 2-1: Toolbar

Drop Down Menus

Figure 2-2: File Menu

Figure 2-3: Edit Menu

Figure 2-8: Window Menu

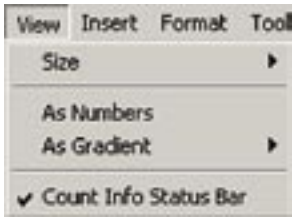

Figure 2-4: View Menu

Figure 2-9: Format Menu

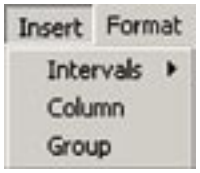

Figure 2-5: Insert Menu

Figure 2-6: Tools Menu

Figure 2-7: 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.

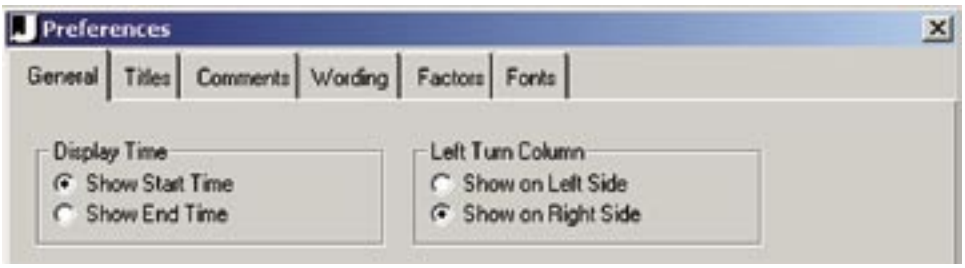

Figure 2-10: Preferences – General tab

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.

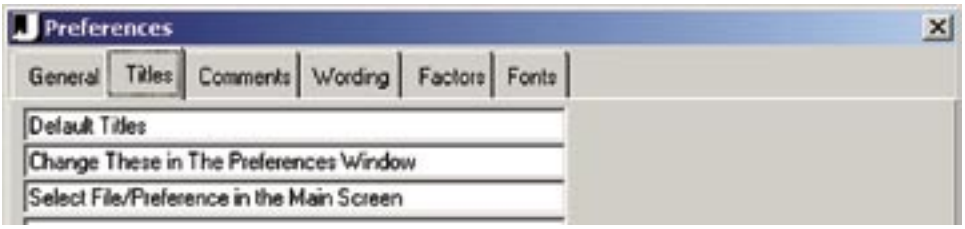

Figure 2-11: Preferences – Titles tab

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* and *Show on Right Side* options have been selected.

Check Boxes

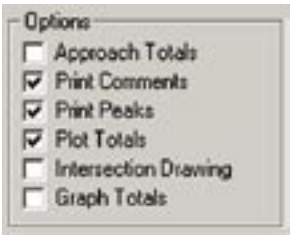

Figure 2-12: Check Boxes

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, PETRA 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 PETRA 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.

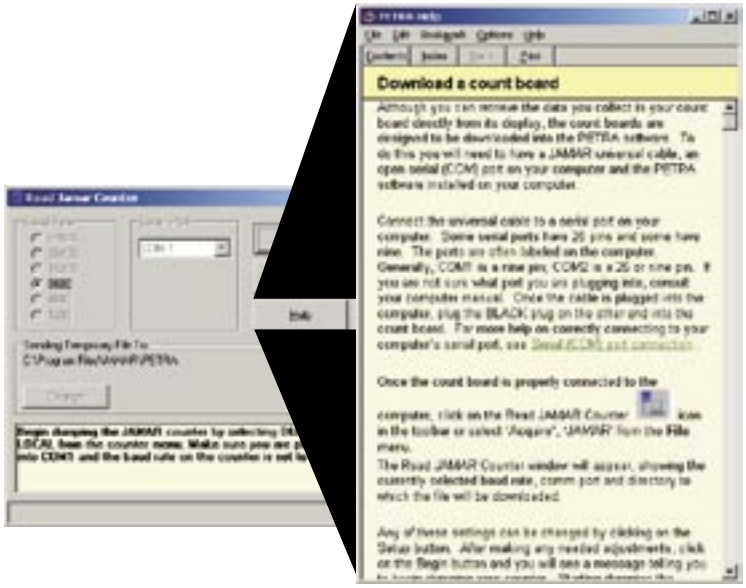

Figure 2-14: Help Pop-up Window

Types of Data Collection & Data Flow

Types of Data Collection

One of the most useful features of the PETRA program is its ability to process several different types of data. The most common type is Turning Movements, which can be collected with the DB-100, DB-400 and TDC-8 hand-held data collectors. Others types of data are Classification, Gap, Signalized Intersection Delay, Spot Speed, Stop Sign Delay, and Saturation Flow, which can be collected with the TDC-8.

PETRA is licensed in a modular format, so you only need to purchase the portions of the program that you use. The base version of the program is for Turning Movement data. Whether or not you have access to the other data types depends on the license you purchased.

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.

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. PETRA 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.

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. PETRA 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 PETRA 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, and number 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.

Data Flow

Depending on the model used, JAMAR hand-held data collectors allow data to be collected in a number of different formats. Once downloaded into PETRA the data can be processed into a variety of reports. The chart below shows the type of data that can be collected, depending on the model.

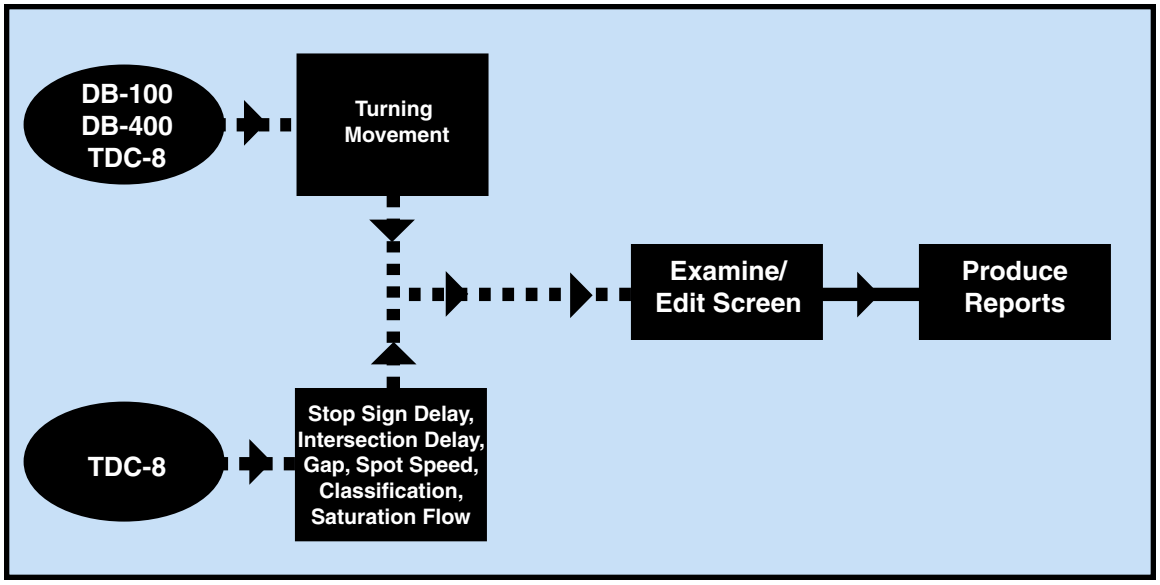

Figure 3-1: Data Flow in PETRA

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Learning the Basics of PETRA

Learning the Basics of PETRA

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 PETRA.

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 **PETRA**. Once into the program, access the Preferences in the manner described in the previous paragraph.

There are six 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 the *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 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 *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 next option is *Open File Window Style*. When opening existing files in PETRA, 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 PETRA 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 preference 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 first option of the right side of the screen 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 next option is *Speed Units*. This setting allows you to choose either miles per hour or kilometers per hour when displaying a speed (Spot Speed data).

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 final option is *Download Option*. This 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.

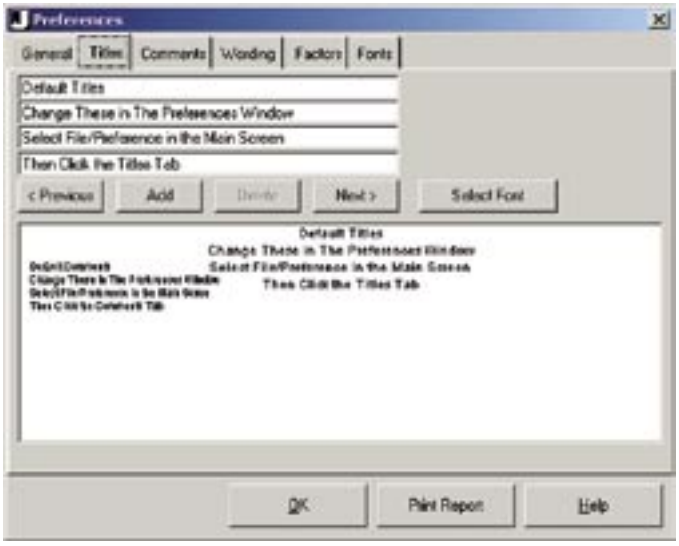


Figure 4-2: Preferences: Titles Tab

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

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. Each line can be edited individually 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 first line of the titles, labeled Default Titles. Delete this line and enter your organization's name. Next, delete the second and third lines and enter your address. Then, delete the fourth line and enter your phone number.

Now that the information for the Titles has been entered, we'll customize each line to give the titles more impact. To do this, click on the first line then click on the *Select Font* button. This will open the standard Windows Font screen, which is used to customize fonts. Set the Font to Arial, the Font style to Bold and the Font Size to 14. If you use a color printer, set the color to Blue. Click OK once this is done and you will be returned to the Preferences screen. Notice that the preview at the bottom of the screen has been updated to show your changes. You can follow the same procedure to customize the second, third and fourth lines of the titles.

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, then use the Select Font button 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.

Once your titles are entered and formatted to your specific taste, click on the 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.

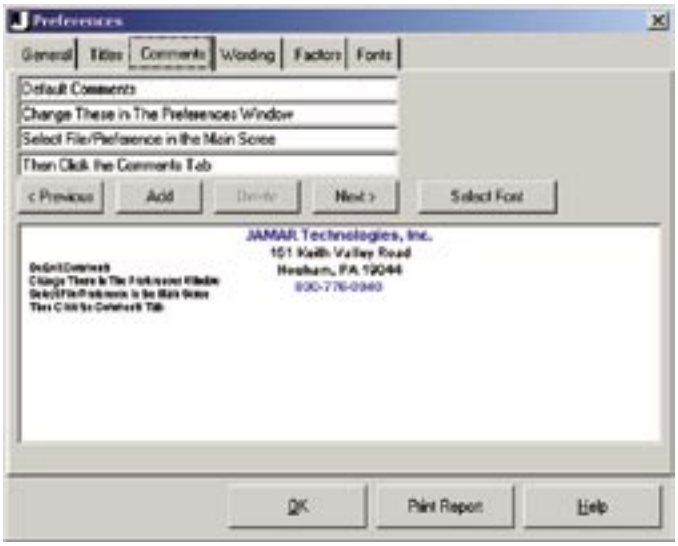


Figure 4-3: Preferences: Comments Tab

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, not on a line for line basis like the titles. Click on the Select Font button to make changes. As with the titles, you can store more than one set of comments in your preferences.

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.

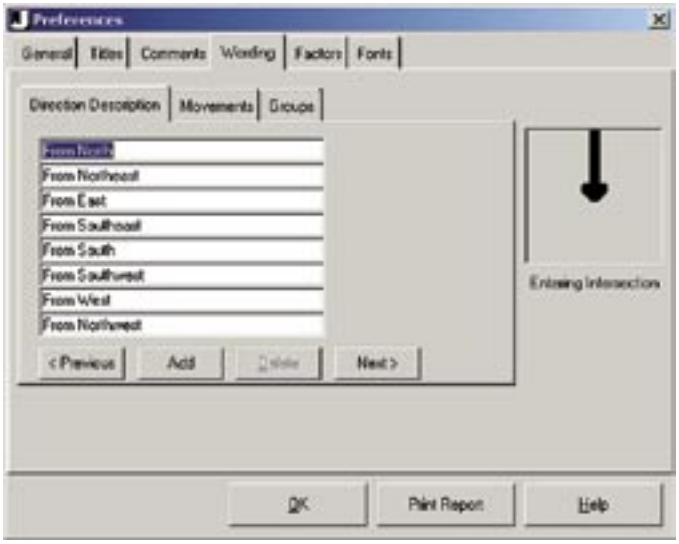


Figure 4-4: Preferences: Wording Tab

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) can be used to collect a variety of things (pedestrians, bicycles, trucks, 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 your hand-held data collector. (The DB-100 does not have Bank 1 and Bank 2 keys.) 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 for the program the way you want, click on the Factors tab.

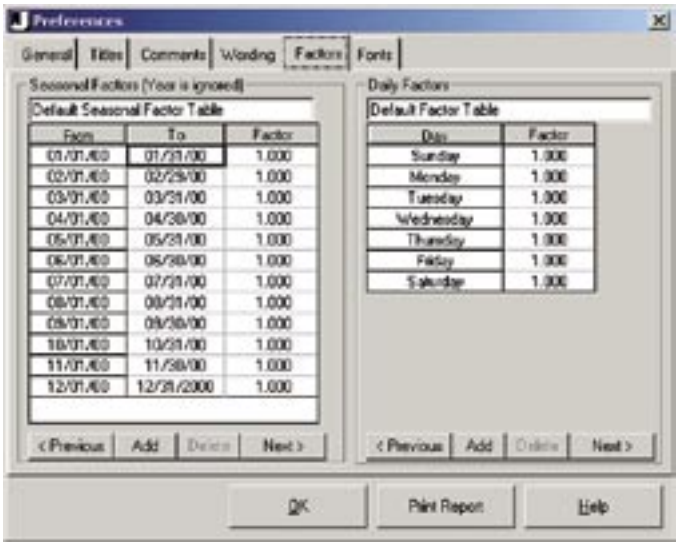


Figure 4-5: Preferences: Correction Factors

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 Fonts tab.

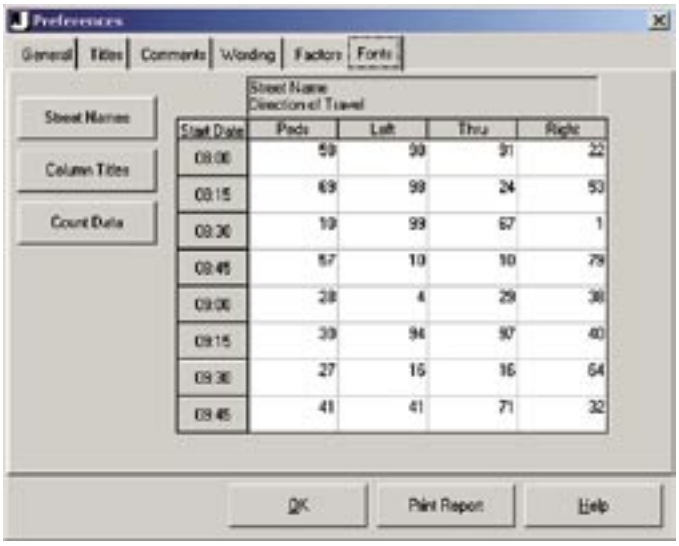


Figure 4-6: Preferences: Default Fonts

The **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 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.

Once you have set the fonts the way you want, click OK.

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 — 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 PETRA can analyze the data. To download a data collector you will need to have a JAMAR universal cable and an open serial (COM) port on your computer.

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.

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.

All JAMAR equipment currently 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.

Once the cable is plugged into the computer, plug the other end into the port on the data collector then click on the *Download a JAMAR Count Board* icon 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.

Figure 4-7: Read JAMAR Counter

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 to 9600. 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 the 9600 we 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 appears for every study contained in the data collector.

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 PETRA. In either case, these files can easily be accessed through the program.

Select **File** from the menu options, then select **Open**. This will bring up the Open File screen. You can also access this screen by clicking on the Open icon in the toolbar.

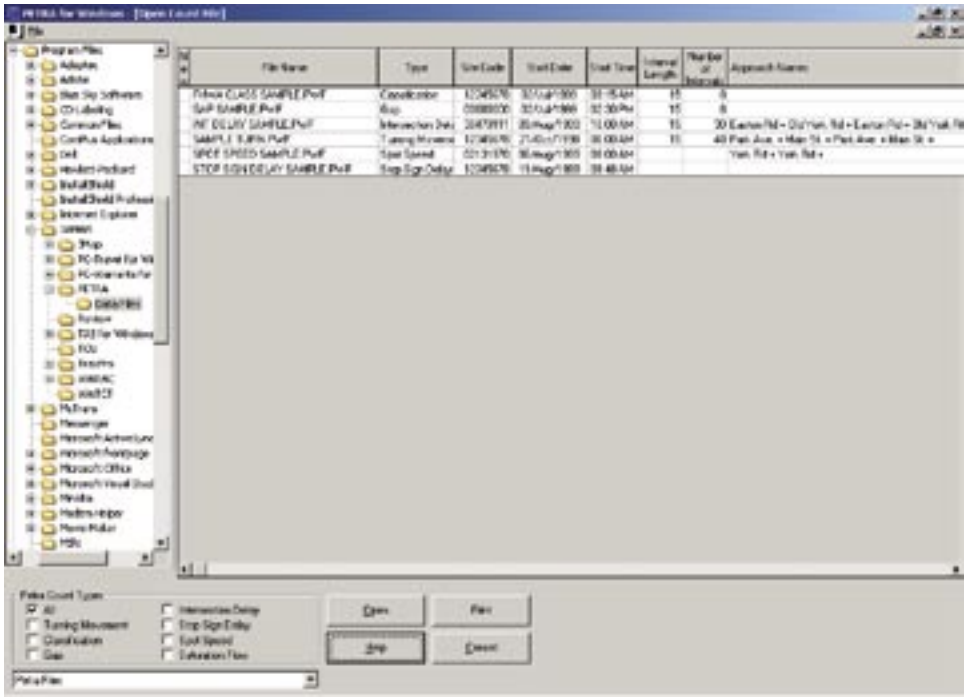


Figure 4-8: Open File Screen

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 were 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\PETRA\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.

Note that there are several types of files that can be opened by the program. Files created in PETRA for Windows, or saved in the PETRA for Windows format, use a .pwf file extension and will appear in black type. Files from the PETRA DOS program, which use the files extensions .pdf, will appear in blue type. These are the file types that the program is defaulted to look for. However, the program can also open files in the IMC (.dfl) 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 appears 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 re-arranged in chronological order. The file list can be sorted in a variety of ways simply by clicking on any of the column titles.

The file we want to retrieve is named *sample turn.pwf*. 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 sample turn file will be opened. You can also open files by double clicking on them.

Congratulations! You have completed the second 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 lesson you'll learn how to work with data files. You can take a break now, or jump right into the next lesson.

Lesson 3 — 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 Turn file that was installed with the program. Other PETRA data files (Classification, Gap, etc.) may look a little different but they all use similar editing functions.

If you already have the Sample Turn file open, great. Otherwise, follow the procedure described in Lesson 2 to open it.

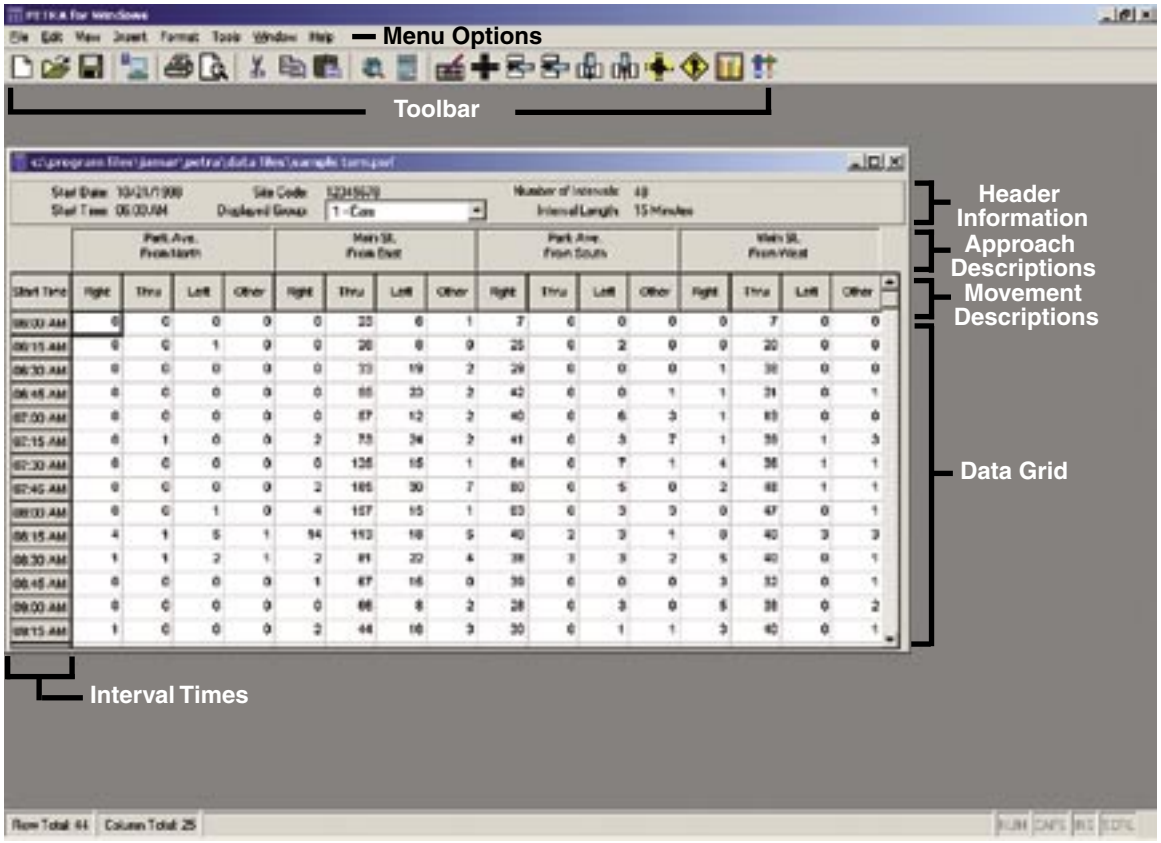


Figure 4-9: Turning Movement File

The first thing we want to do is identify the various parts of the file. The data file contains five main areas of information, as shown in Figure 4-9 above: Header Information, Approach Descriptions, Movement Descriptions, 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 4-9.

Edit Header

We'll start by taking a look at the Header Information. Each PETRA file contains not only the data for the file, but other information that is pertinent to it, such as the start date, start time, etc. Most of this information is stored in the file's header. To edit the header, click on the Edit Header icon in the tool bar. This will open the Edit Header Information window.

Note that the Start Date and Time for the file are listed at the upper left. 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.

The top left of the screen contains the comments for this file. General comment information is read in from what has been set up in the Preferences. You then use this screen to add information specific to the file. The Sample Turn file already has comments added, but we're going to add our own just so we get familiar with how it is done.

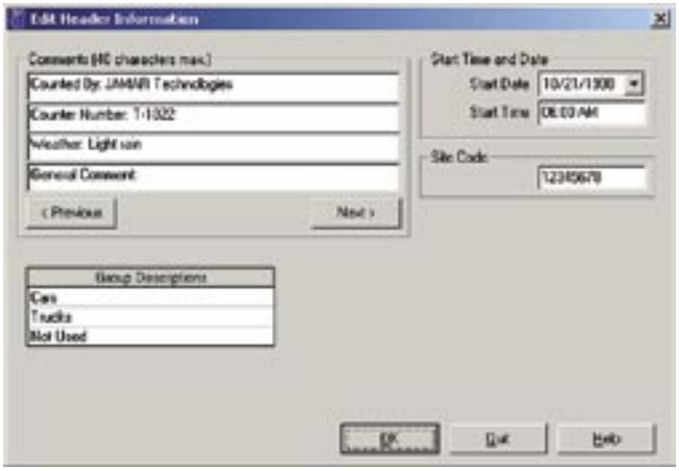


Figure 4-10: Edit Header Information

Click on the *Next* button in the Comments field and you'll see a new set of general comments appear. Do these look familiar? They should – they were the Comments that we entered into the Preferences in Lesson 1. (If you used your own custom comments in Lesson 1 then you might not match up exactly with the description below, but you can follow along anyway.)

Now we'll fill in the information for these comments. Click your cursor to the right of the colon on line one. Do you remember what the original comments listed for the weather? If you said 'Light Rain', you get a gold star. Type this into line one.

Next, click to the right of Serial Number on line two. Do you remember what the serial number was? If you said T-1022, you get another gold star. Type this into line two. 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 Group Description 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 Turn file don't match what you entered in the Preferences. The Sample Turn descriptions were created when the file was originally made - changes in the Preferences don't affect existing files like this one. If you want to change the descriptions for an existing file you can do so here. In this case, it looks like the Sample Turn file was collected with Cars counted on the unshifted keys, Trucks on Bank 1, and no data on Bank 2. We have no reason to think this wasn't the case, so we'll leave them the way they are. 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.

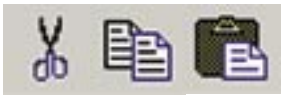
If you look at the top of the data Window you'll see some of the information we just saw in the Header listed on the screen, including the Start Date & Time, and Site Code. Also notice the Displayed Group field at the top middle. This field is used to let you view the data in the other groups of the file. Click the down arrow in this field and select *Trucks* from the list. Notice that the data changes to show you the new group. Repeat the process and select *Not Used*. As you can see, there was indeed no data collected for this group. Reset the displayed group field to group 1, Cars.

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

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. PETRA makes it easy for you to manually enter data.

Cut, Copy Paste

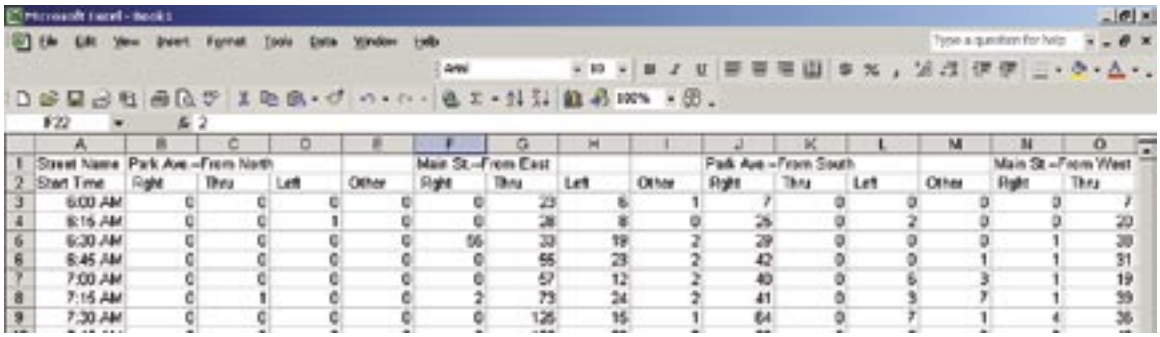
Another easy way to edit your data is though the Cut, Copy and Paste commands. PETRA supports these standard Windows commands, which makes it easy to move data from one column to another, or from one file to another, or from the program into a different program.



Copy Formatted

If you need to move your data into another program (like Excel) to do some custom processing, PETRA 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 PETRA dropped in, along with the interval times and column titles.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Street Name	Park Ave.–From North				Main St.–From East				Park Ave.–From South				Main St.–From West	
2	Start Time	Right	Thru	Left	Other	Right	Thru	Left	Other	Right	Thru	Left	Other	Right	Thru
3	6:00 AM	0	0	0	0	0	23	6	1	7	0	0	0	0	7
4	6:15 AM	0	0	1	0	0	28	8	0	25	0	2	0	0	20
5	6:30 AM	0	0	0	0	56	33	19	2	29	0	0	0	1	38
6	6:45 AM	0	0	0	0	0	55	23	2	42	0	0	1	1	31
7	7:00 AM	0	0	0	0	0	57	12	2	40	0	6	3	1	19
8	7:15 AM	0	1	0	0	2	73	24	2	41	0	5	7	1	39
9	7:30 AM	0	0	0	0	0	126	15	1	64	0	7	1	4	36

Figure 4-11: Data Pasted in Excel

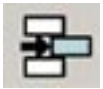
Insert & Delete Intervals

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.

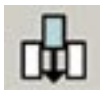
Now that we've seen how easy it is to add intervals, we'll try deleting them. Click on *Edit* in the menu options, then go to *Delete Interval*. Like with adding intervals, you are presented with three options: Delete From Beginning, Delete Current Interval and After and Delete From End. We're going 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.

PETRA 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.

Insert & Delete Columns



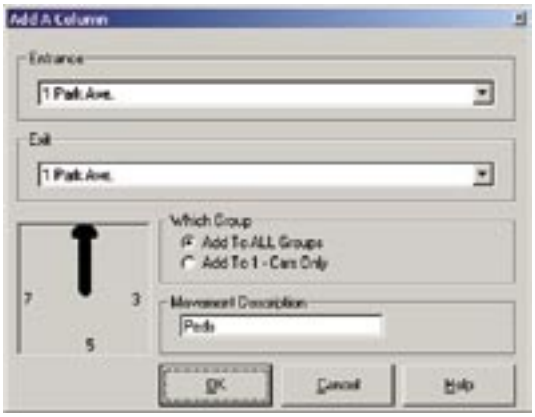
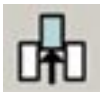


Figure 4-12: Add a Column

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

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 Park Ave.', since this is the North approach, and set the Exit field to '7 Main St.', 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 setup 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.



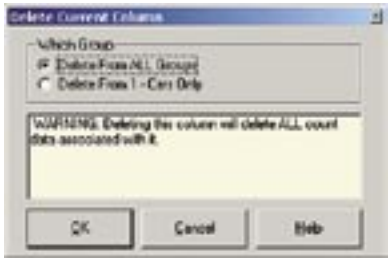


Figure 4-13: Delete a Column

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. The Delete Current Column window will then appear, asking whether you want to delete the column from just the active group or all groups. Note that you can also use the Delete Current Column icon to access this screen. 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, PETRA 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 *Rght* 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 Turn file, so click on Cancel.

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.

Edit Street Names

As we just saw, double clicking on a movement's column title allows you to access an editing feature of the program. This is also the case for double clicking on an approach's title. Double click on the box that reads 'Park Ave. From North' and the New Street Name window will appear.

Figure 4-14: New Street Name

This screen lets you quickly and easily enter new street names or change existing names. We don't want to change the street name for this file, so click on Cancel. Note that you can also apply street names to a file using the Intersection Design tool, which is discussed in the next lesson.

Format Data

In addition to giving you a lot of flexibility for adding or removing data to a file, PETRA 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 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 PETRA 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. Now go back to the View menu, go to Size and select Fit to Both. This tells the program to show all your intervals on the screen at one time. You can now easily see that the highest volume movements for the file are the through movements for the eastbound and westbound approaches, with some additional elevated volumes for the Right movement on the northbound (From South) approach. Once you are done looking at this, go back to the View menu, reset the Size to Fit to Width, 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.

Congratulations! You have completed lesson three. 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 PETRA has. You can take a break now, or jump right into the next lesson.

Lesson 4 — 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 Turn file that was installed with the program. If you already have the Sample Turn file open, you're ready to go. Otherwise, follow the procedure described in Lesson 2 to open it.

Intersection Design

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.

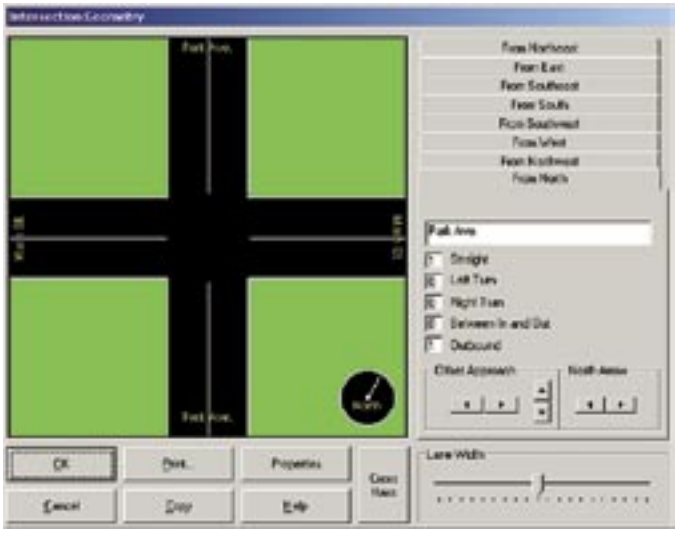


Figure 4-15: Intersection Design

The Intersection Geometry tool allows you to provide a graphical representation of the intersection 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. The existing street name for the approach is listed and can be changed if necessary. Lanes can be added for straight, left turn, right tun and outbound by changing the number listed in each of these boxes. Median dividers can be added by using the Between In and Out box.

The default view that you see for the Sample Turn 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. Notice that the display updates to show the change, but it doesn't look exactly the way we want.

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 75. Notice that the display look a little clearer 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. To help us do this we'll use the cross hair guides. Click on the button labelled Cross Hairs and you'll see some guidelines appear.

The North, South and East approaches look pretty good, but the West approach is a little off center. Click on the From West tab so this approach is active, then use the down arrow in the Offset Approach field to move the approach down until it lines up with the cross hair.

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.

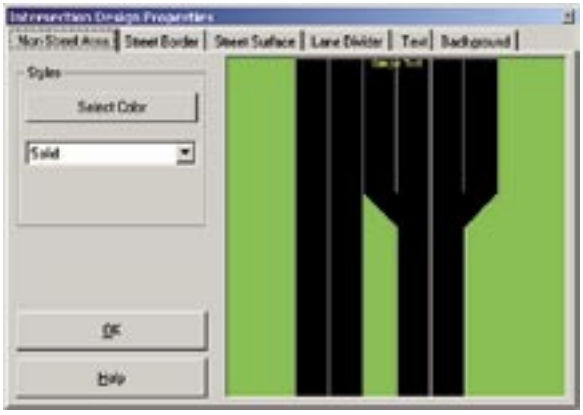


Figure 4-16: Intersection Design Properties

Click on the Properties button 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 and change the color to a purple or dark blue. 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.

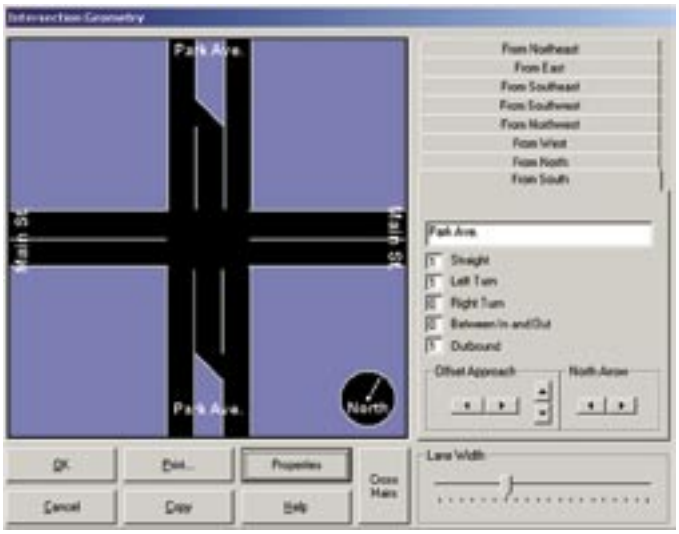


Figure 4-17: Revised Intersection Design

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 to exit out of the Design Properties. Your intersection should now look similar to the one in Figure 4-17.

Once you are satisfied with the look of your intersection you can print it by itself using the Print button, or include it with the full report for your data file. We'll cover how to do this in a later lesson. Click Ok to exit out of the Intersection Geometry screen and return to the main data screen.

Note that there are a wide variety of ways you can change the look of the intersection design with this tool. 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.

Order Approaches

The next Tool on the list of options is Order Approaches. This tool allows you to rearrange the order in which the approaches in the file are listed in the program and on reports. Go to the Tools menu and select Order Approaches. 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.

Figure 4-18: Order Approaches

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

Now that we've seen how this works, lets go back and return the file to its default order. Go back to the Order Approaches selection of the Tool menu, and again click on *From South*. This time click the down arrow once, which moves From South back below From East. Click OK and the approaches move back to their original order.

Rotate Count Board

Now that we've seen how to move an approach with its data, let's take a look at how to move data without changing the order of the approaches. This is done using the next tool on the list, Rotate Count Board.

When data is downloaded from a JAMAR hand-held data collector PETRA 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 tool comes in handy. It allows you to orient your data in PETRA regardless of how it was collected.

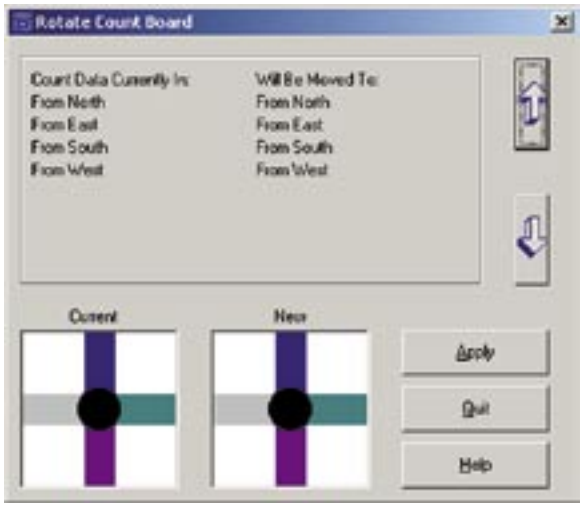


Figure 4-19: Rotate Count Board

Go to the Tools menu and click on Rotate Count Board. The Rotate Count Board window will then appear. Note that you can also access this screen by clicking on the Rotate Count Board icon.

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 Turn 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.

Now that we've seen how this works, let's return the data to its default order. Go back to the Rotate Count Board selection of the Tool menu, and again click the up arrow twice. This moves the data we have rotated back to its original position. Click Apply and the data is back to where we started.

Factor Data

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.

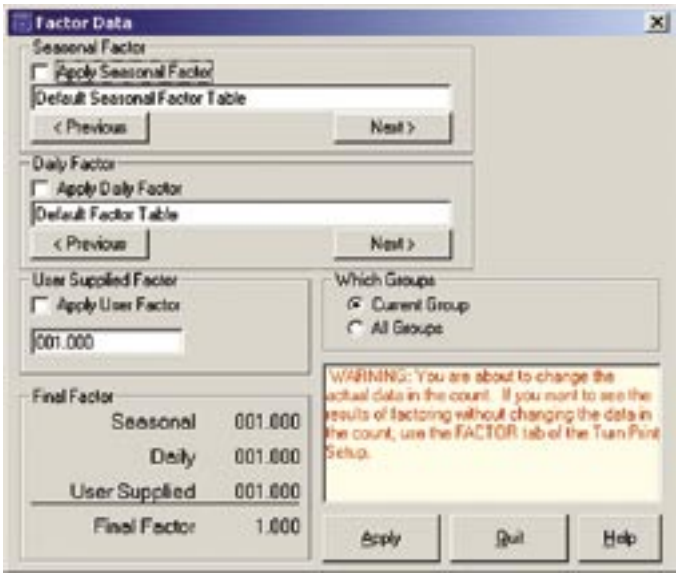


Figure 4-20: Factor Data

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 Group 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.

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.

Combining Files

The next tool we are going to look at is the Merge Wizard. This is one of the more powerful features of PETRA. It allows you to quickly and easily combine multiple files into one. Data can be merged, chained or moved from one group into another. Merging is typically done if two or more people were used to collect data at the same intersection at the same time. Chaining is typically done if data was collected at the same intersection at different times throughout the day.

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 Turn for this lesson. You should still have the Sample Turn file open – if not, open it now. Go to the File menu and select Save As. This will open the Save As window, which lets you save a copy of an existing file with a new name. Change the file name to Sample Turn2 (clever, huh?) and click the Save button. We've now saved a copy of the Sample Turn file – while keeping the original file as well.

For this lesson we're going to chain the data from our Sample Turn2 file to the end of the original Sample Turn file. Since both file have the same start time, we're going to change the start time of the Sample Turn2 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 Sample Turn2 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 3. 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 Turn 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. PETRA keeps a list of the last eight files used and displays them here for easy access. Locate Sample Turn in the list and click on it to open it.

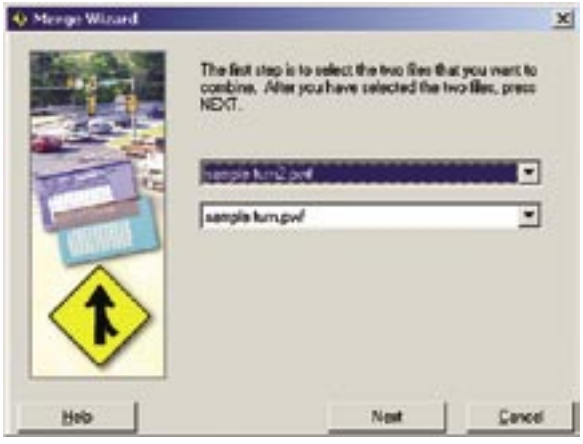


Figure 4-21: Merge Wizard – Step 1

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 lists the files you are going to combine. 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. Sample Turn and Sample Turn2 are the ones we want, so click Next.

Figure 4-22: Merge Wizard – Step 2

The next screen prompts us to decide what we want to do with the two files – either Merge/Chain the data into one file or move the data from one group into a new group.

Most of the time, if not all of the time, you will be Merge/Chaining data into one file. That's what we are going to do for this lesson so click the radio button next to Merge/Chain the data into one count. Once this is done, click Next.

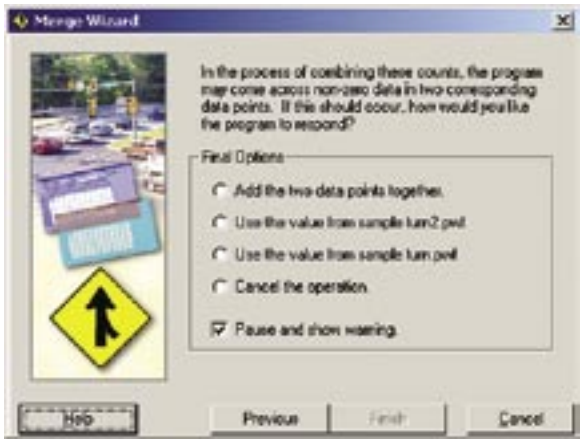


Figure 4-23: Merge Wizard – Step 3

The last screen of the Merge Wizard is for error checking. In a typical file merge or chain, 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: Add the two data points together, Use the value from [file 1], Use the value from [file 2], or Cancel the Operation.

The Add the two data points together option would normally only be used if a person took a break during an interval and their co-worker picked up their count during that time. The other options are self-explanatory. 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 to have this happen.

Note that the Final Options also contains a feature that can be very helpful in finding potential problems. The *Pause and show warning* 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.

Now that we have all of our options selected, click on the Finish button. PETRA 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 got 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 Sample Turn2 file.

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

Graphs

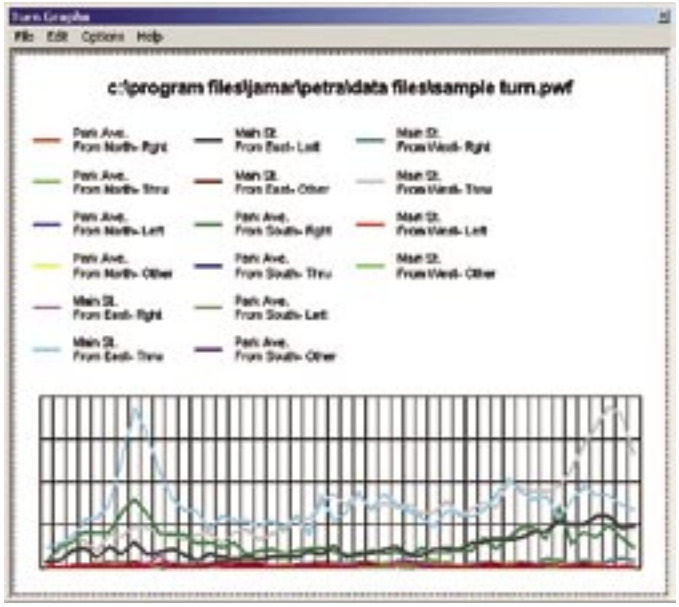


Figure 4-24: Graphs

The next tool on the menu is Graphs. PETRA contains a powerful graphing engine that allows you to create visually informative charts and graphs in a matter of minutes. To access the program's 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.

We will cover the capabilities of the Graph tool in detail in the Advanced Lessons found in Chapter 5.

Variable Width Plot

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

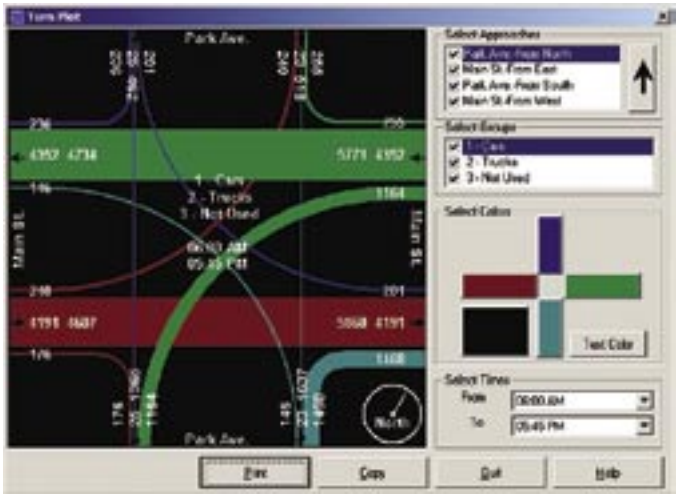


Figure 4-25: Variable Width Plot

To access this feature, go to the Tools menu and select Variable Width Plot and the Turn Plot window will appear. Note that you can also access this screen by clicking on the Variable Width Plot 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 Park Ave. – From North and notice that the volumes for this approach disappear. Reclick the box to put the data back.

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 2 – 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 Group 2 is 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 light 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 westbound through movement volumes went from 4352 when we showed all the data to 175 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 Plot 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.

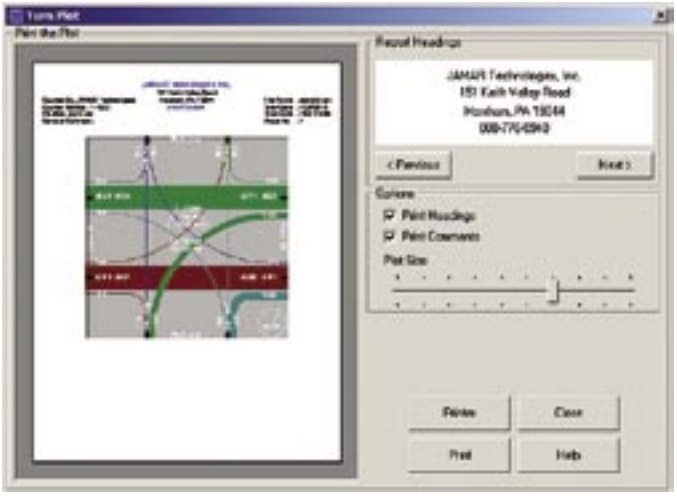


Figure 4-26: VWP Print Preview

If you want to print the plot by itself you can do so by clicking on the Print button. Click this button and the print setup for the plot will appear.

This screen shows a preview of how the plot will look when printed. 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.

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

Note that the Variable Width Plot 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.

Congratulations! You have completed lesson four. In this lesson we learned how to use some of the Tools in PETRA. 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 5 — 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 Turn data file. 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 lesson 2 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 4-27: 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 the Sample Turn file is continuous, so we really 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 turn 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 3 for more information on this. Since we took the time to enter these comments, we might as well print them so leave the box checked.

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 4. Since we set this up in Lesson 4, place a check in the box.

The sixth and last item on the list is *Graph*. If this is checked the report will include a copy of the Variable Width Plot, which we covered in Lesson 4. Place a check in this box as well.

To the right of the Options field is the *Combine Groups* field. This fields lets you select which groups you want to include in the report. We're going to print both group 1 (Cars) and well as group 2 (Trucks), so place a check next to group 2.

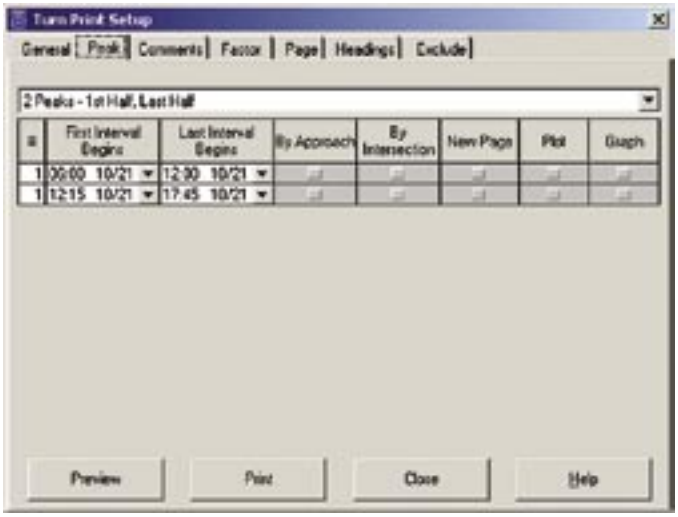


Figure 4-28: Turn Print Setup - Peak tab

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

This tab is used to setup 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 change the box to 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:

By Approach	Select this option to have the program determine the peak hour on an approach by approach basis.
By Intersection	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.

New Page	Select this option to force a page break to occur before printing the peak analysis.
Plot	Select this option to include a standard intersection plot of the peak data in the report.
Graph	Select this option to include a Variable Width Plot 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.

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.

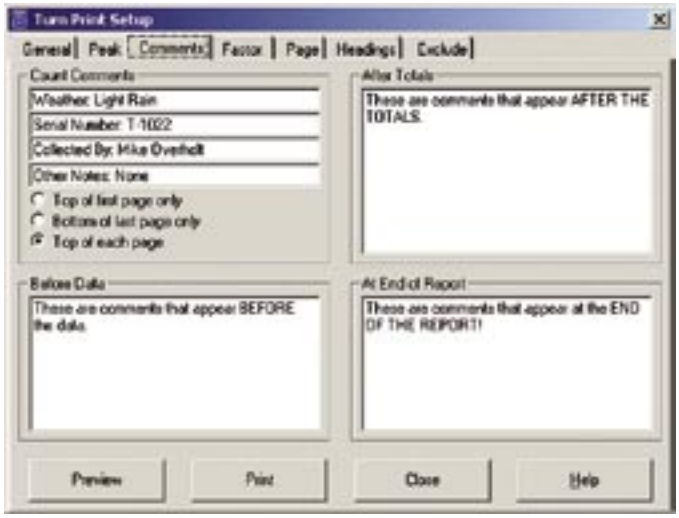


Figure 4-29: Turn Print Setup - Comments tab

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 right look familiar? It should – we entered these comments using the Edit Header in lesson 3. 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 rest of this tab is used to enter additional information for the report. You are given three sections to work with: Before Data, After Totals and At End of Report. We aren't going to add any additional information, so delete the text in these three boxes.

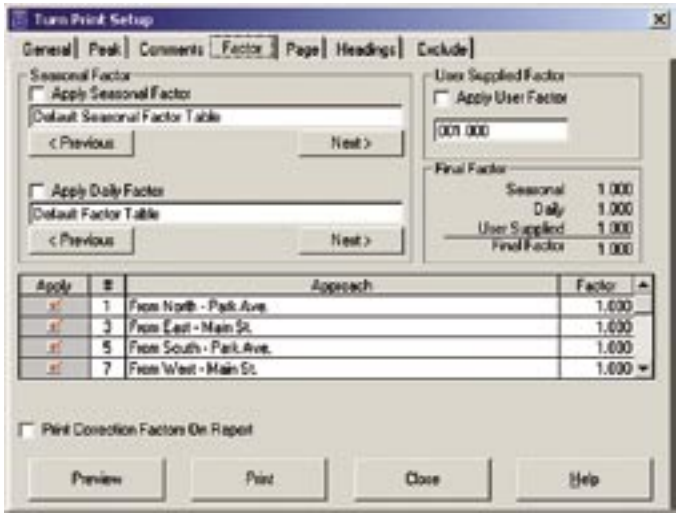


Figure 4-30: Turn Print Setup - Factor tab

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 4. 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.

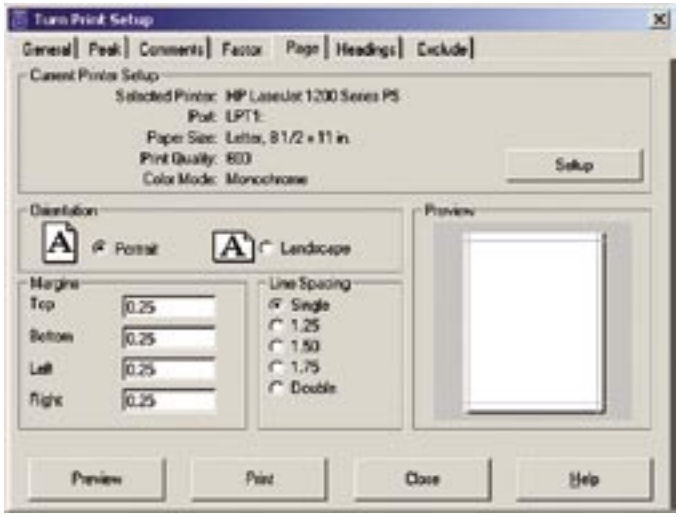


Figure 4-31: Turn Print Setup - Page tab

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.

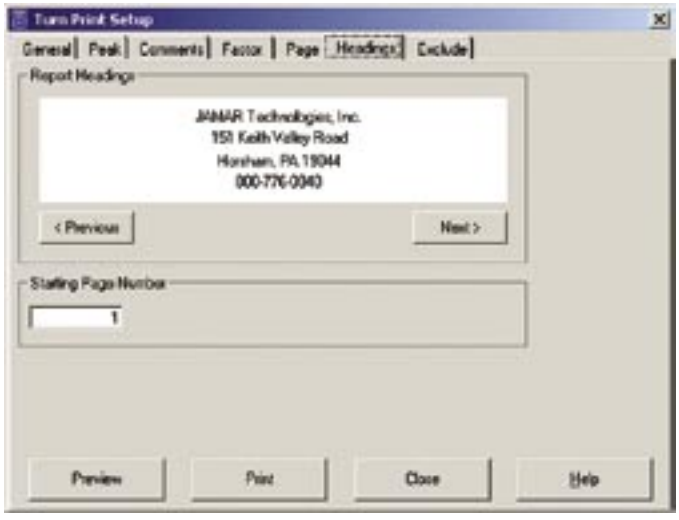


Figure 4-32: Turn Print Setup - Heading tab

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.

Below 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 PETRA. For this report, we'll leave it set for 1.

Now click on the final tab, Exclude.

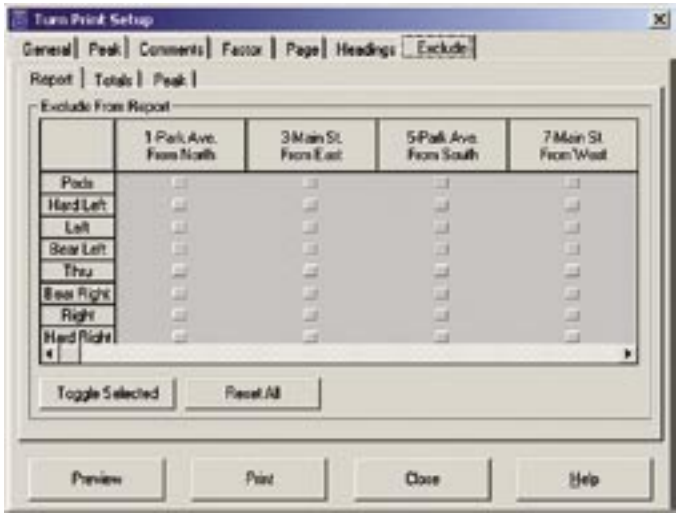


Figure 4-33: Turn Print Setup - Exclude tab

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.

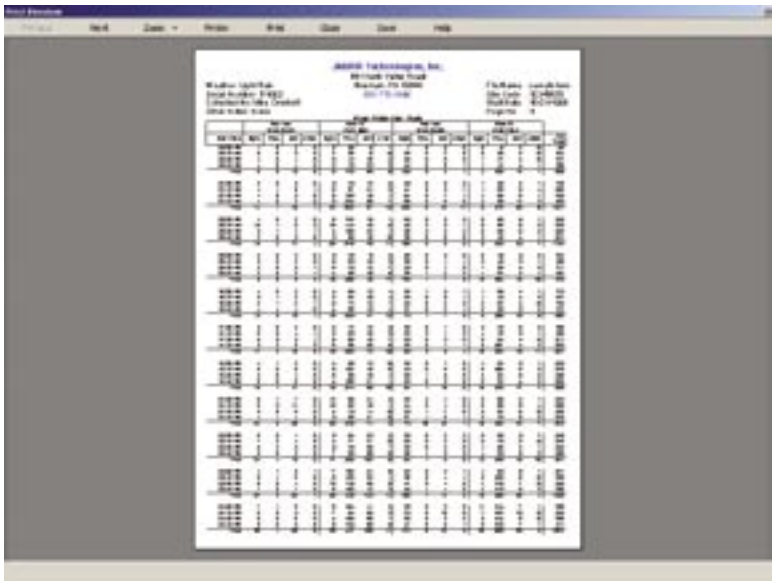


Figure 4-34: Report Review

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 under the *Zoom* menu can also be used to get a different look at the report. The *Thumbnail*

selection provides small pictures of each page of the report. Click on this selection to see how it looks. The *Two Pages* selection will do just what is says, show two pages at a time in the preview. Click on this selection to see how it looks. The *Whole Page* selection shows a complete page in the preview. Click on this selection to see how it looks. This 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. 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 Next button and you'll see the standard intersection plot. Click Next again and the Variable Width Plot appears. Click Next a third time and the peak information is shown. Click Next one last time and the Intersection Drawing appears. Notice that once you get to the last page of the report the Next button is no longer enabled.

Save Reports Electronically

Should you need to save the finished report in an electronic format you can do so by clicking on the Save button. This will create a copy of the report in .ppf format, which is the format used by the JAMAR Review program. With this program, which can be downloaded for free from our web site, other people can view your finished PETRA report without having to have PETRA. This allows you to e-mail reports or post them on the Internet.

Now that we are finished previewing the report, it's time to print it out. To do this, click on the Print button and the report will be sent to the printer.

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

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Advanced Lessons

Advanced Lessons

Lesson 1 — Creating a Three Approach File

When working with turning movement files, one of the most common occurrences you will encounter is an intersection which has only three approaches, also know as a 'T' intersection. PETRA allows you to customize your data and reports to reflect this, using some of the functions discussed in the previous chapter. For this lesson we'll change a standard four approach file to a three approach file, using the Sample Turn file that was installed with the program. Open this file in the program. If you're not sure how to do that, refer to Lesson 2 of Chapter 4.

After opening the Sample Turn file, you will see it lists four standard approaches.

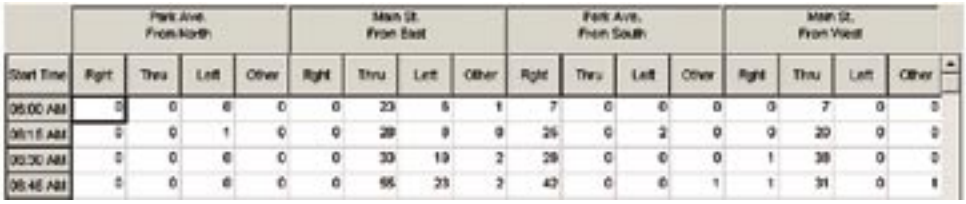


Figure 5-1: Initial Four Approaches

For this lesson we're going to remove the Park Ave. From North (or Southbound) approach. The first step to doing this is to access the Intersection Design, which can be found in the Tools menu.

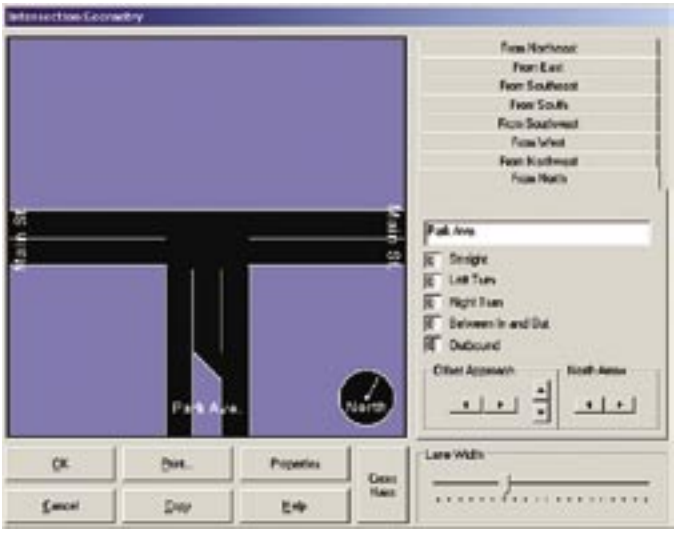


Figure 5-2: Edited Intersection Design

When first accessed, the intersection diagram shows four approaches. To remove the approach at the top, select it from the list of tabs on the right of the screen. Change any of the 1s listed in the Straight, Left Turn, Right Turn, Between In and Out or Outbound boxes to zeroes and the approach will be removed, as shown in figure 5-2.

Removing an approach from the Intersection Diagram does not automatically remove the data for the approach from the file. The next step is to remove the data from the deleted approach. After clicking OK in the Intersection Design screen you will be returned to the data screen. To remove the columns of data from the approach, click on the column title of the column you want to remove. This will highlight the column as shown is figure 5-3.

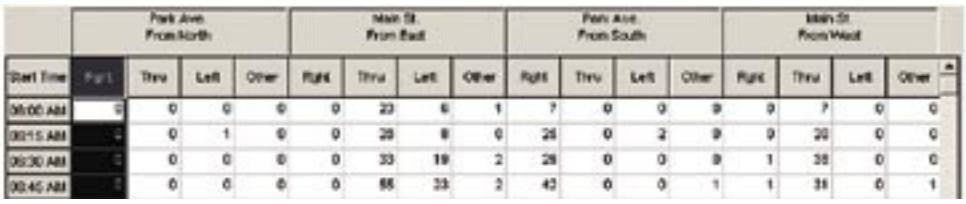
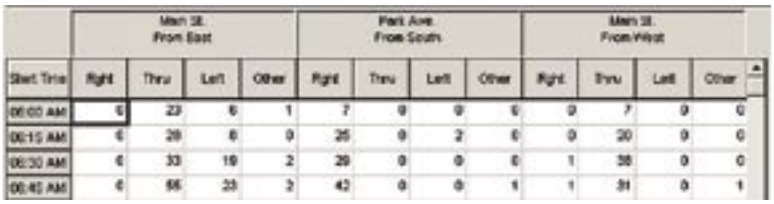


Figure 5-3: Highlighted Data Column

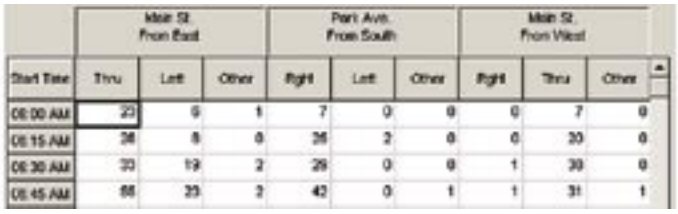
Next, delete the column by using the Delete Column selection of the Edit menu, or by clicking on the Delete Current Column icon. Follow the same procedure to delete the other columns from this approach. *The columns can only be deleted one at a time.* Once the columns are deleted, the data screen should look like figure 5-4 below.



	Main St. From East				Park Ave. From South				Main St. From West			
Start Time	Right	Thru	Left	Other	Right	Thru	Left	Other	Right	Thru	Left	Other
08:00 AM	0	23	6	1	7	0	0	0	0	7	0	0
08:15 AM	0	28	6	0	26	0	2	0	0	30	0	0
08:30 AM	0	33	19	2	29	0	0	0	1	30	0	0
08:45 AM	0	66	35	2	42	0	0	1	1	31	0	1

Figure 5-4: Modified Data Screen

The final step in the process is to delete the columns of data that would normally be moving into the fourth approach from the remaining three approaches. In the file we are working with, this would be the Thru column in the From South approach, the Right column in the From East approach, and the Left column in the From West approach. Once these columns are deleted the data screen should look like figure 5-5 below.



	Main St. From East			Park Ave. From South			Main St. From West		
Start Time	Thru	Left	Other	Right	Left	Other	Right	Thru	Other
08:00 AM	23	6	1	7	0	0	0	7	0
08:15 AM	28	6	0	26	2	0	0	30	0
08:30 AM	33	19	2	29	0	0	1	30	0
08:45 AM	66	35	2	42	0	1	1	31	1

Figure 5-5: Final Data Screen

At this point, the process is finished. When a report is produced it will reflect the data as being from a three legged approach.

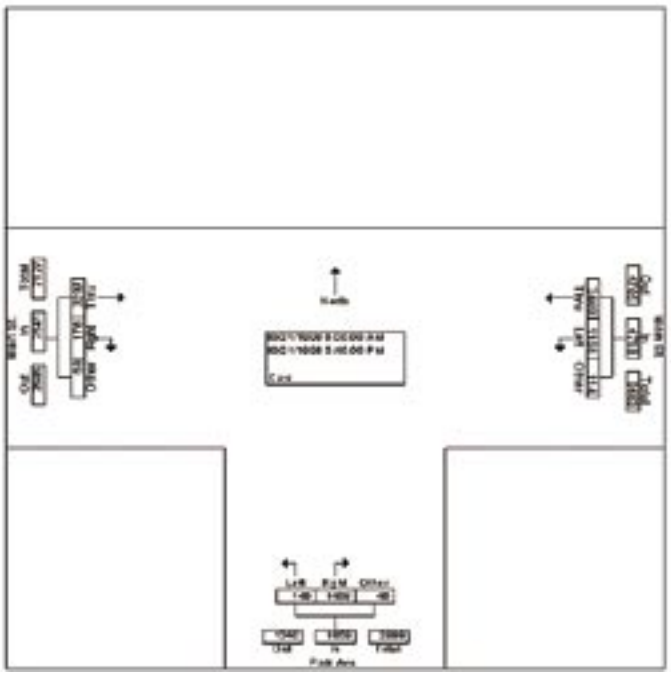


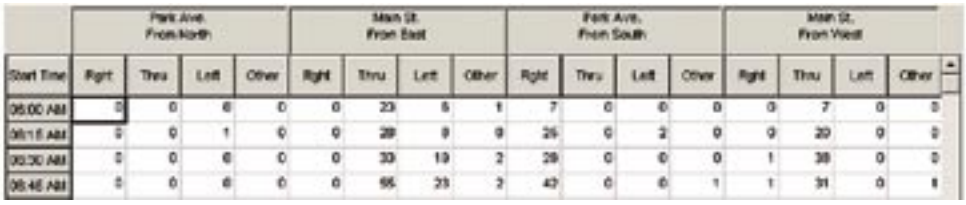
Figure 5-6: Three Approach Plot

Congratulations! You have completed lesson one. In this lesson we learned how to create a three approach file. In the next lesson we'll learn how to produce a five (or more) approach file. You can take a break now, or jump right into the next lesson.

Lesson 2 — Creating a Five (or more) Approach File

Like three approach intersections, you may occasionally encounter an intersection with five (or more) approaches. PETRA allows you to customize your data and reports to reflect this, using some of the functions previously discussed. For this lesson we'll change a standard four approach file to a five approach file, using the Sample Turn file that was installed with the program. If you still have this file open from the previous lesson close it **without** saving your changes, then reopen it.

After opening the Sample Turn file, you will see it lists four standard approaches.



Start Time	Park Ave. From North				Main St. From East				Park Ave. From South				Main St. From West			
	Right	Thru	Left	Other	Right	Thru	Left	Other	Right	Thru	Left	Other	Right	Thru	Left	Other
06:00 AM	0	0	0	0	0	23	5	1	7	0	0	0	0	7	0	0
06:15 AM	0	0	1	0	0	28	9	0	26	0	2	0	0	20	0	0
06:30 AM	0	0	0	0	0	33	19	2	28	0	0	0	1	38	0	0
06:45 AM	0	0	0	0	0	66	23	2	42	0	0	1	1	31	0	1

Figure 5-7: Initial Four Approaches

For this lesson we're going to add the fifth leg as the From Northeast approach. The first step to doing this is to access the Intersection Design, which can be found in the Tools menu.

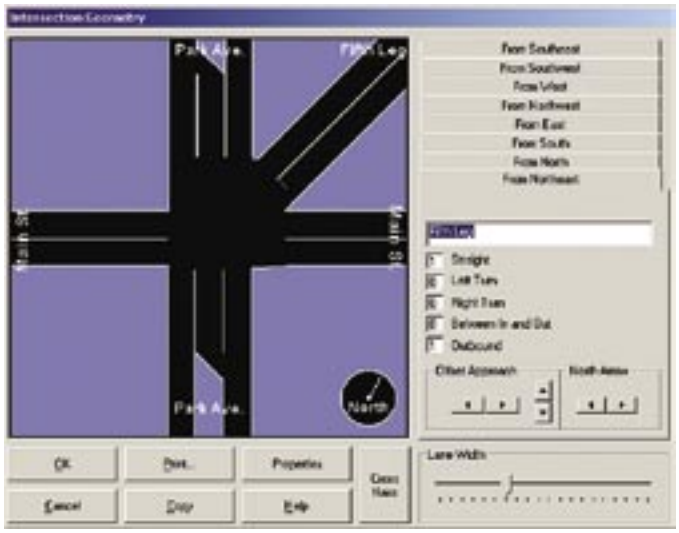
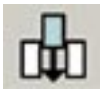


Figure 5-8: Edited Intersection Design

When first accessed, the intersection diagram shows four approaches. To add a fifth approach, select From Northeast from the list of tabs on the right of the screen. Next, assign a street name to the approach. For this lesson we'll name it Fifth Leg. Now change the zeroes listed in the Straight and Outbound boxes to 1s and the approach will be added. You may need to move the other approaches around to line everything up correctly. If you are not sure how to do this refer to lesson 4 in Chapter 4. Once you are finished your design should look similar to figure 5-8.

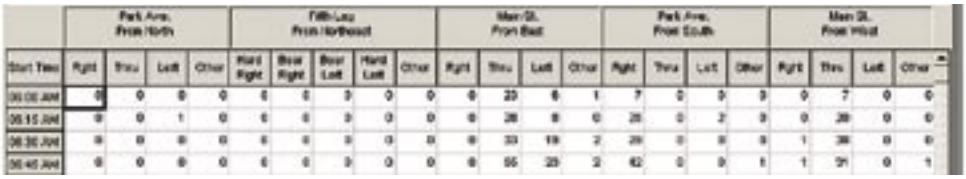


Adding an approach to the Intersection Diagram does not automatically add data columns for the approach to the file. The next step is to add the data columns to the new approach. After clicking OK in the Intersection Design screen you will be returned to the data screen. To add columns of data to the approach, select Column from the Insert menu or click on the Insert a Column icon. This will open the Insert a Column window.

Figure 5-9: Insert a Column

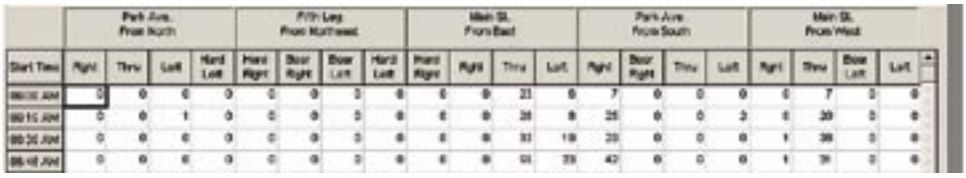
To add columns for the new approach, set the Entrance to *Fifth Leg* and the Exit to any of the other approaches. When the column is added, you will see the new approach start to appear in the data. Follow this same procedure until columns are added for data going into each of the other four approaches. To add an 'Other' (or Peds) column, set the Entrance and Exit both to the Fifth Leg. Once this is done, the data screen should look like figure 5.10.

Figure 5-10: Modified Data Screen



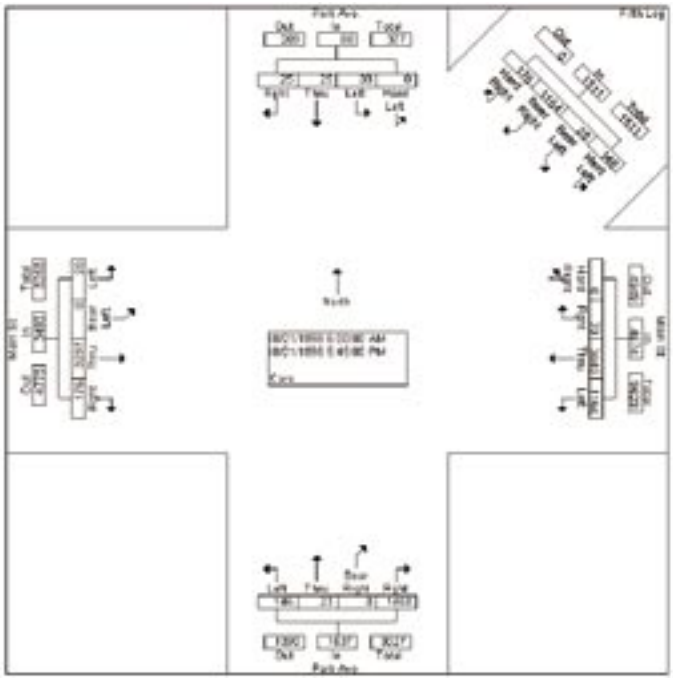
The next step in the process is to add the columns of data from the other four approaches that would normally be moving into the fifth approach. Use the Insert a Column function to do this, setting the Exit each time to the Fifth Leg. After this is done, remove all the 'Other' columns so we don't have to try to squeeze too much information onto the report. This is done by highlighting the column to remove then clicking the Delete a Column icon. Once these changes are complete your data screen should look like figure 5-11 below.

Figure 5-11: Final Data Screen



At this point, you need only add the actual data for these added columns. This can be done using the Copy and Paste function to move the data from where you collected it, usually either in a different file or in Group 1 or Group 2. Once your data is added you can produce a report that will reflect the additional approach.

Figure 5-12: Five Approach Plot



The previous steps can be repeated to add additional approaches, up to a total of eight. When producing reports with five or more approaches you may need to print in landscape mode in order for all the information to fit on the page properly.

Congratulations! You have completed lesson two. In this lesson we learned how to create a five approach file. In the next lesson we'll learn about some of the capabilities of the graphing tool in PETRA. You can take a break now, or jump right into the next lesson.

Lesson 3 — Working with Graphs

The graphing ability of PETRA is one of the most powerful features of the program. With it 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.

We'll be working with the Sample Turn file that was installed with the program. If you still have this file open from the previous lesson close it **without** saving your changes, then reopen it.

The graphs for the program can be accessed by either selecting Graph from the Tools menu or by clicking on the Graph icon. Click on this icon now.

Figure 5-13: 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 first step is to select the type of graph we want. This is done by using the **Options** menu. Select Options from the menu then slide to Type.

Figure 5-14: Initial 3D Pie Graph

PETRA 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 line graph to a three dimensional pie graph.

In the initial pie graph a graph is shown for each interval, which does not give a good representation of the data. To give a better representation of the data we'll again use the Options menu.

The *Sum Intervals* and *Sum Approaches* options allow you combine data to present it more clearly. Select Sum Interval and the data will be combined into one pie graph representing all the intervals in the study. Next, select Sum Approaches and the various movements within an approach are combined. This produces a single pie graph of all the data.

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 5-15: 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 Park Ave. From North.

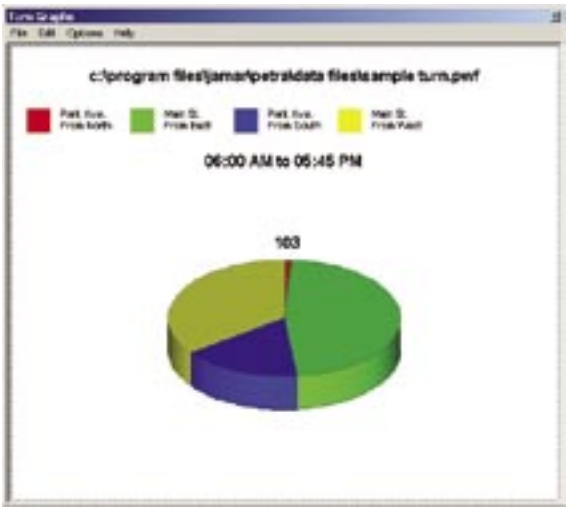


Figure 5-16: Graph with First Label

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

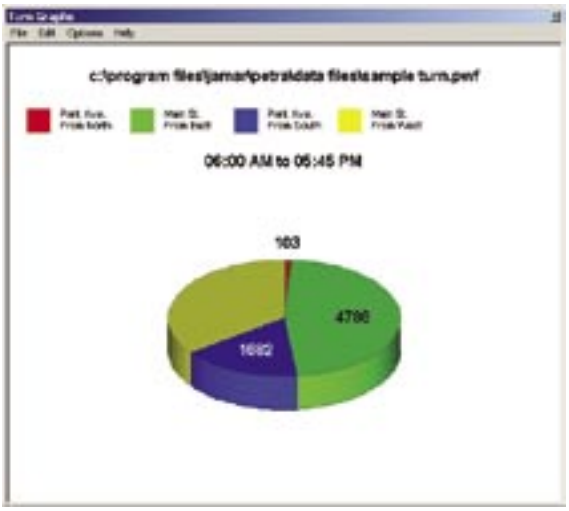


Figure 5-17: Highlighted Data Column

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.

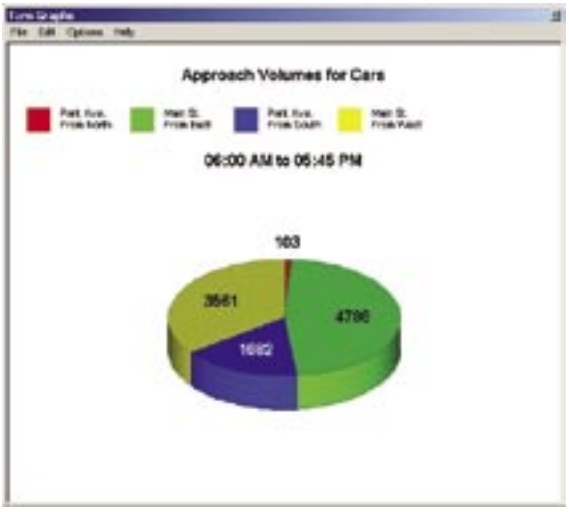


Figure 5-18: Final Graph

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 Cars*. 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 lesson 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.

Congratulations! You have completed lesson three. In this lesson you learned how to create and edit graphs. This lesson concludes the tutorial for learning some of the advanced features of PETRA. You should now have a good understanding of some of the more powerful functions of the program.

Turning Movement Files & Reports

Turning Movement Files

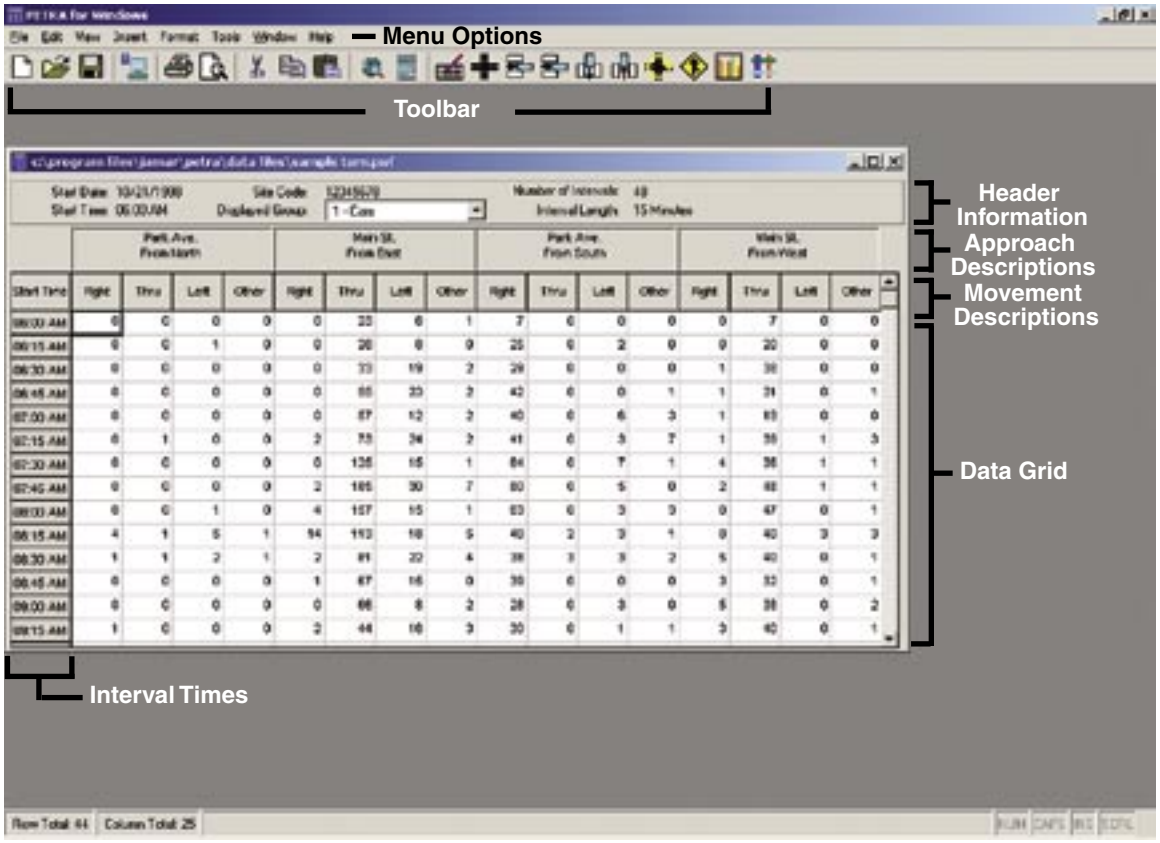


Figure 6-1: Turning Movement File

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 five main areas of information: the Header Information, Approach Descriptions, Movement Descriptions, Interval Times and Data Grid. These area are shown in Figure 6-1 above.

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 Chapter 4.

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- Cars

	Park Ave. From North				Main St. From East				Park Ave. From South				Main St. From West				
Start Time	Right	Thru	Left	Other	Right	Thru	Left	Other	Right	Thru	Left	Other	Right	Thru	Left	Other	Int. Total
06:00 AM	0	0	0	0	0	23	6	1	7	0	0	0	0	7	0	0	44
06:15 AM	0	0	1	0	0	28	8	0	25	0	2	0	0	20	0	0	84
06:30 AM	0	0	0	0	0	33	19	2	29	0	0	0	1	38	0	0	122
06:45 AM	0	0	0	0	0	55	23	2	42	0	0	1	1	31	0	1	156
Total	0	0	1	0	0	139	56	5	103	0	2	1	2	96	0	1	406
07:00 AM	0	0	0	0	0	57	12	2	40	0	6	3	1	19	0	0	140
07:15 AM	0	1	0	0	2	73	24	2	41	0	3	7	1	39	1	3	197
07:30 AM	0	0	0	0	0	126	15	1	64	0	7	1	4	36	1	1	256
07:45 AM	0	0	0	0	2	186	30	7	80	0	5	0	2	48	1	1	361
Total	0	1	0	0	4	440	81	12	225	0	21	11	8	142	3	6	953
08:00 AM	0	0	1	0	4	157	15	1	63	0	3	3	0	47	0	1	295
08:15 AM	4	1	5	1	14	113	10	5	40	2	3	1	0	40	3	3	253
08:30 AM	1	1	2	1	2	81	22	4	38	3	3	2	5	40	0	1	206
08:45 AM	0	0	0	0	1	67	15	0	39	0	0	0	3	32	0	1	158
Total	5	2	8	2	21	418	70	10	180	5	9	6	8	159	3	6	912
Grand Total	5	3	9	2	25	997	207	27	508	5	32	18	18	397	6	12	2271
Approch %	25.3	15.8	47.4	10.5	2.0	79.4	16.5	2.1	90.2	0.9	5.7	3.2	4.2	91.7	1.4	2.8	
Total %	0.2	0.1	0.4	0.1	1.1	43.9	9.1	1.2	22.4	0.2	1.4	0.8	0.8	17.5	0.3	0.5	

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 each column is broken down into what percentage of the approach it is and what percentage of the overall data it is.

Standard Intersection Plot

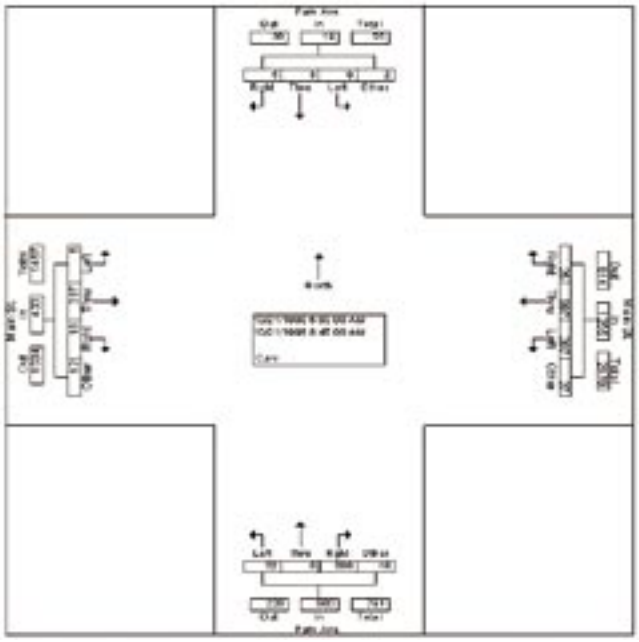


Figure 6-3: TM Report - Standard Plot

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 12 for a more detailed explanation of this.

Variable Width Plot

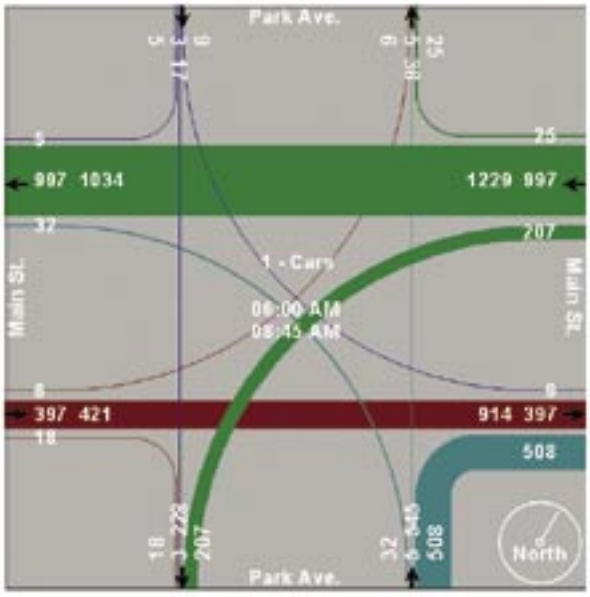


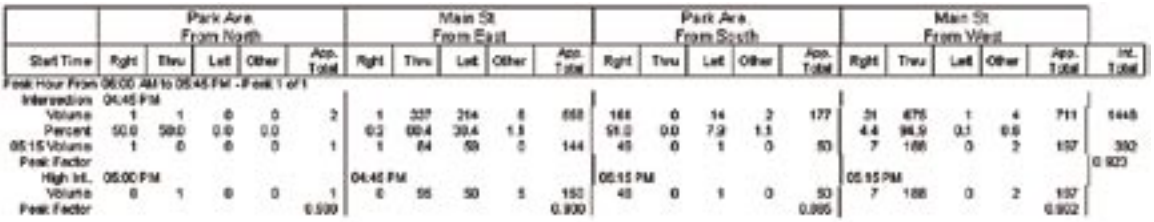
Figure 6-4: TM Report - Variable Width Plot

If the Graph Totals box is checked in the Options field of the General tab of the Turn Print Setup, a variable width plot 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 plot 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 page 4.23 for more information on setting up peak information for reports.



	Park Ave. From North					Main St. From East					Park Ave. From South					Main St. From West					
Start Time	Right	Thru	Left	Other	App. Total	Right	Thru	Left	Other	App. Total	Right	Thru	Left	Other	App. Total	Right	Thru	Left	Other	App. Total	Int. Total
Peak Hour From 06:00 AM to 06:45 PM - Peak 1 of 1																					
Intersection 04:45 PM																					
Volume	1	1	0	0	2	1	337	314	6	658	168	0	14	2	177	31	675	1	4	711	1448
Percent	50.0	50.0	0.0	0.0		0.2	60.4	39.4	1.5		95.0	0.0	7.9	1.1		4.4	94.9	0.1	0.6		
05:15 Volume	1	0	0	0	1	1	84	59	0	144	48	0	1	0	53	7	188	0	2	197	392
Peak Factor																					0.923
High Int. 05:00 PM						04:45 PM					05:15 PM					05:15 PM					
Volume	0	1	0	0	1	0	95	50	5	150	48	0	1	0	53	7	188	0	2	197	
Peak Factor					0.500					0.930					0.885					0.922	

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 third line lists the volumes for the hour by each movement while the fourth line lists what percentage they are of the approach.

The next two lines list the time of the highest interval within the peak hour, and the volumes for that high interval for each approach. The Peak Factor, also know as peak hour factor or phf is then given for the entire intersection at the far right if the peak is being done by intersection. Below this is listed the high interval and volumes of each approach within the peak hour, along with their Peak Factor. Refer to the Appendix for more information on how the Peak Hour Factor is calculated.

If a plot of the peak data has been requested in the Peak tab of the Turn Print Setup, a standard intersection plot of the peak data will follow the regular peak analysis. This plot is similar to the one described on the previous page. 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.

If a graph of the peak data has been requested in the Peak tab of the Turn Print Setup, a Variable Width plot of the peak data will be produced with the report. This is a graphical depiction of the data using lines of varying width to depict the volumes of specific movements. Refer to the section titled Variable Width Plot on page 4.20 for more information on this.

Intersection Drawing

Figure 6-6: 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 4 for more information on how to design an intersection with this tool.

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Classification Files & Reports

Classification Files

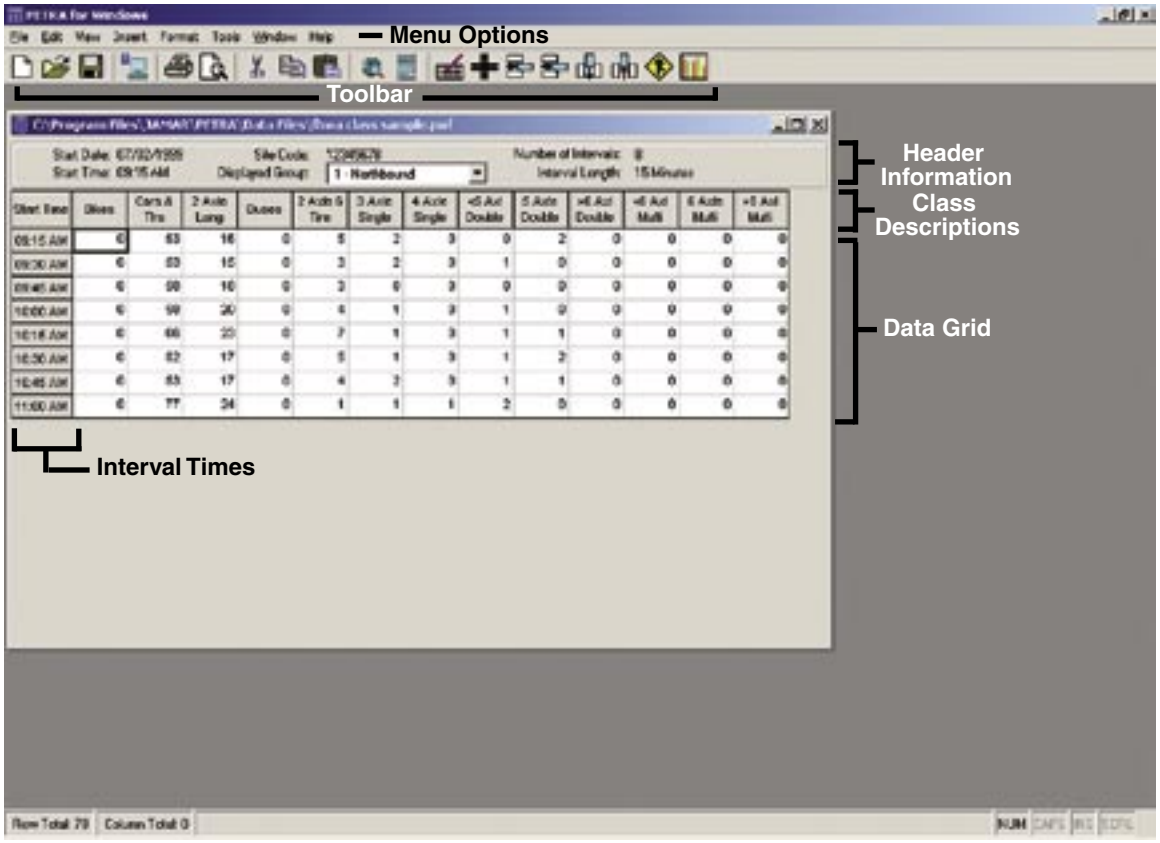


Figure 7-1: Classification File

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 Figure 7-1 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 Chapter 4 for more information.

Edit Class Descriptions

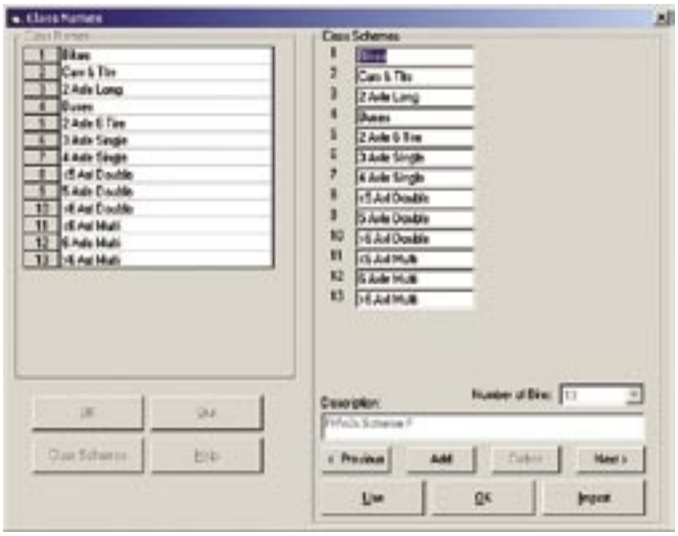


Figure 7-2: Edit Class Descriptions

One feature that is unique to Classification files is the *Edit Class Descriptions* Tool. This Tool, which can also be accessed from the Tools menu or by double-clicking on one of the existing class definition column titles, 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 from the DOS version of PETRA.

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 4 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	>5 Axl Double	<6 Axl Multi	5 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	56	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 7-3: 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 7-4: Class Report - Peak Analysis

Start Time	Bikes	Cars & Trks	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>5 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 Occured: 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	105
PHF	0.851													

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. Refer to page 6.5 for more information on this.

Signalized Intersection Delay Files & Reports

Signalized Intersection Delay Files

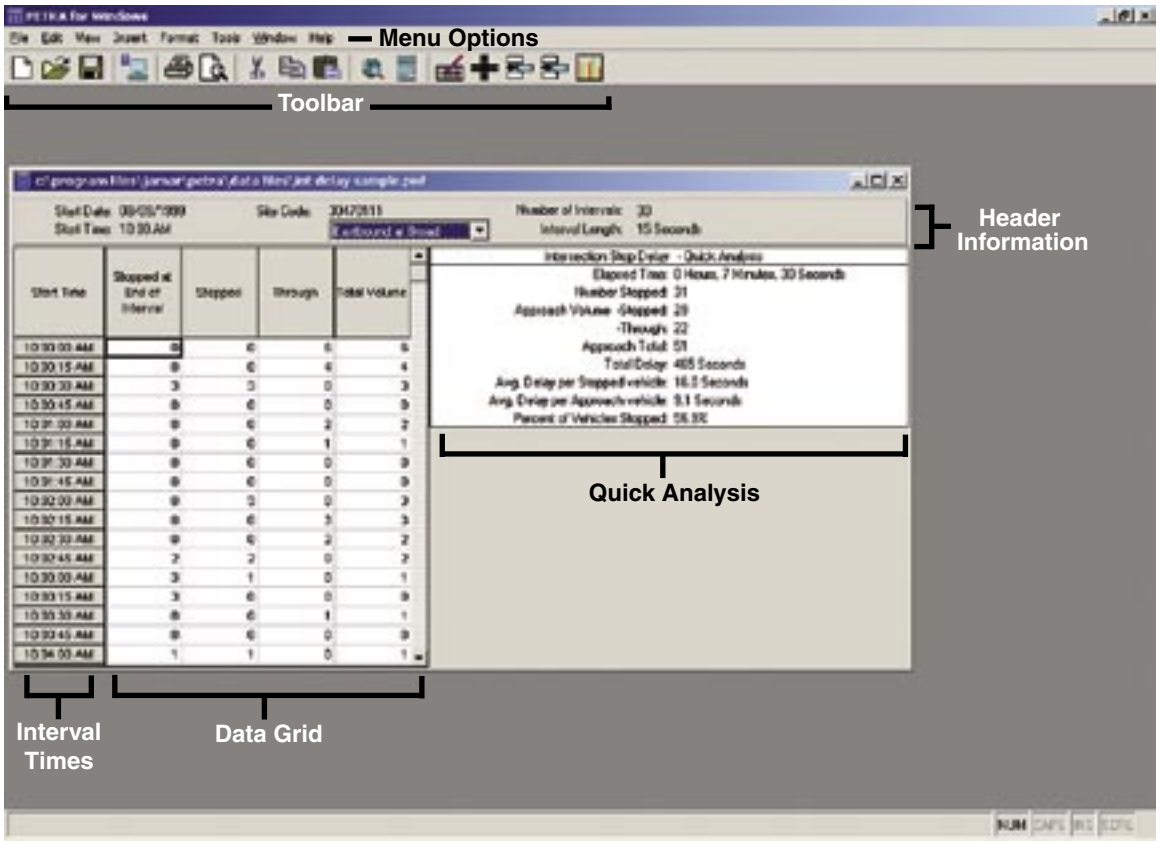


Figure 8-1: Signalized Intersection Delay File

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 figure 8.1 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 Chapter 4 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 4 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 8-2: 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 8-3: 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. Refer to page 6.5 for more information on this.

Gap Files & Reports

Gap Files

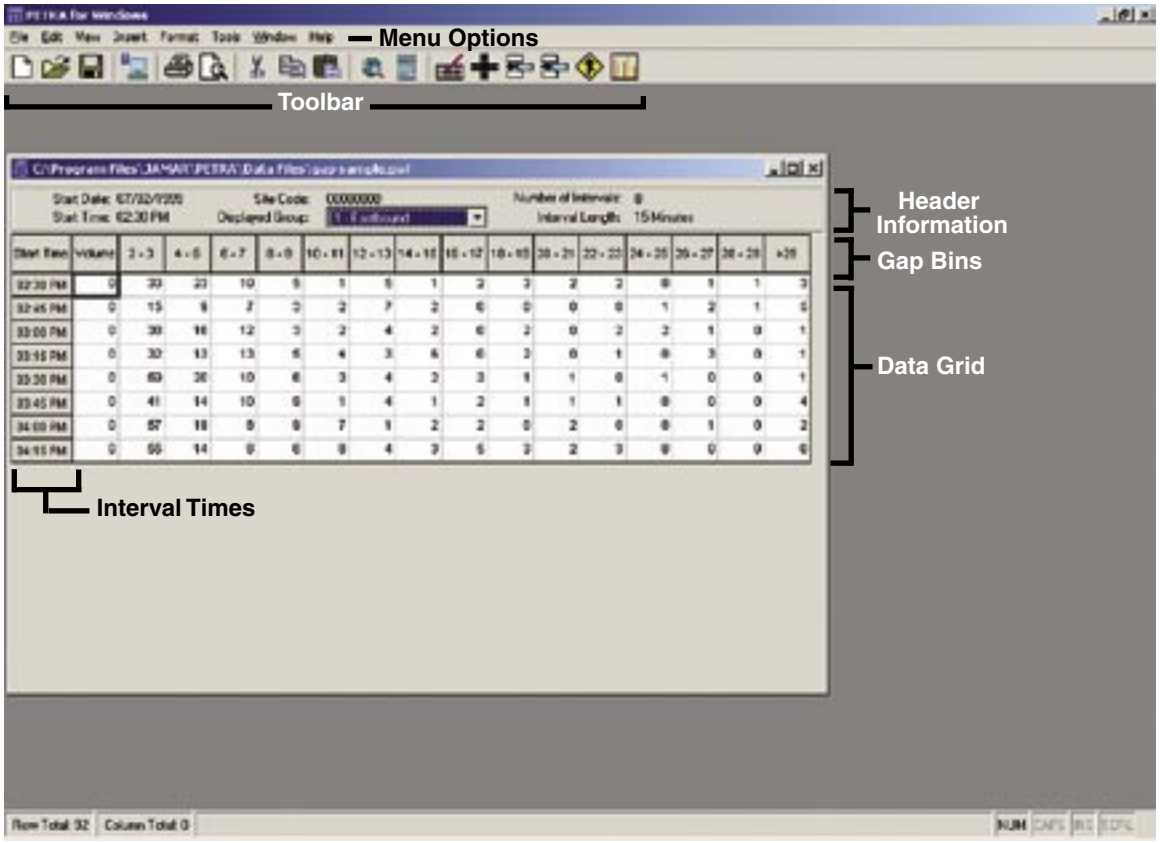


Figure 9-1: Gap File

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 four main areas of information: the Header Information, Gap Bins, Interval Times and Data Grid. These are shown in Figure 9-1 above. The data grid lists the number of specific gaps that occurred per interval. For example, in the Gap file shown in figure 9-1 above there were 33 different gaps of between two and three seconds from 2:30 to 2:45 for the Eastbound direction. There were 23 different gaps of four to five second, 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 Chapter 4 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.

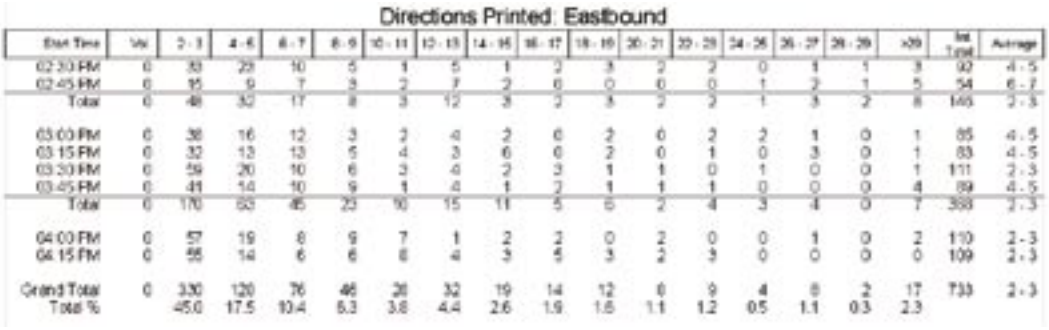
Figure 9-2: Edit Column 1 Label

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 4 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: 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	Average
02:30 PM	0	33	23	10	5	1	5	1	2	3	2	2	0	1	1	3	92	4 - 5
02:45 PM	0	15	9	7	3	2	7	2	0	0	0	0	1	2	1	5	54	6 - 7
Total	0	48	32	17	8	3	12	3	2	3	2	2	1	3	2	8	146	2 - 3
03:00 PM	0	38	16	12	3	2	4	2	0	2	0	2	2	1	0	1	85	4 - 5
03:15 PM	0	32	13	13	5	4	3	0	0	2	0	1	0	3	0	1	83	4 - 5
03:30 PM	0	59	20	10	6	3	4	2	3	1	1	0	1	0	0	1	111	2 - 3
03:45 PM	0	41	14	10	9	1	4	1	2	1	1	1	0	0	0	4	89	4 - 5
Total	0	170	63	45	23	10	15	11	5	6	2	4	3	4	0	7	368	2 - 3
04:00 PM	0	57	19	8	9	7	1	2	2	0	2	0	0	1	0	2	110	2 - 3
04:15 PM	0	66	14	6	6	0	4	3	5	3	2	3	0	0	0	0	109	2 - 3
Grand Total	0	330	120	76	46	20	32	19	14	12	6	9	4	8	2	17	733	2 - 3
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		

Figure 9-3: Gap 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. 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 9-3 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.**

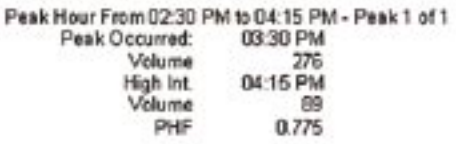


Figure 9-4: Gap Report - Peak Analysis

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. Refer to page 6.5 for more information on this.

Stop Sign Delay Files & Reports

Stop Sign Delay Files

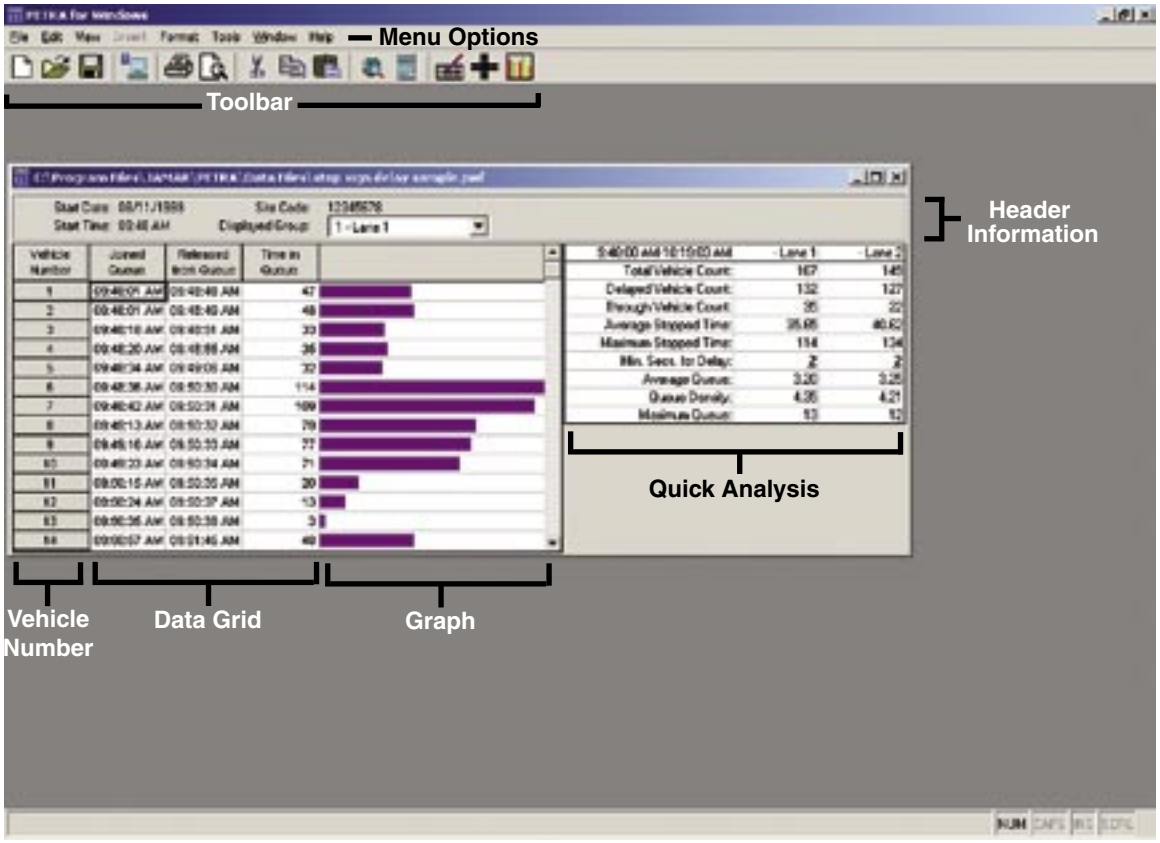


Figure 10-1: Stop Sign Delay File

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 figure 10-1 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 entered 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.

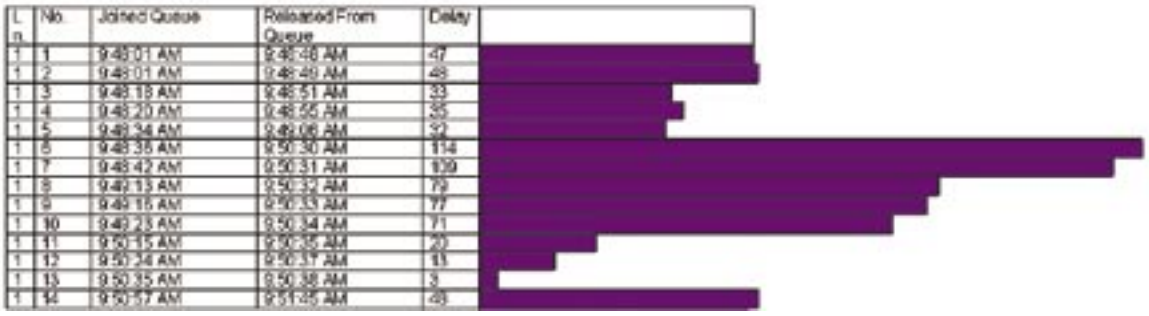
For example, if two seconds is entered the program will consider any vehicles that had to stop for zero or one seconds as not having been delayed. An example of this would be a vehicle doing a 'rolling' stop where it was recorded as leaving the queue immediately after entering it.

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 Chapter 4 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 4 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



Ln	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	9:50:16 AM	9:50:37 AM	81
1	13	9:50:35 AM	9:50:38 AM	3
1	14	9:50:37 AM	9:51:25 AM	48

Figure 10-2: Stop Sign Delay 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 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

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

Figure 10-3: Stop Sign Delay Report - Summary

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 page 10.2 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 10.2 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. Refer to page 6.5 for more information on this.

Spot Speed Files & Reports

Spot Speed Files

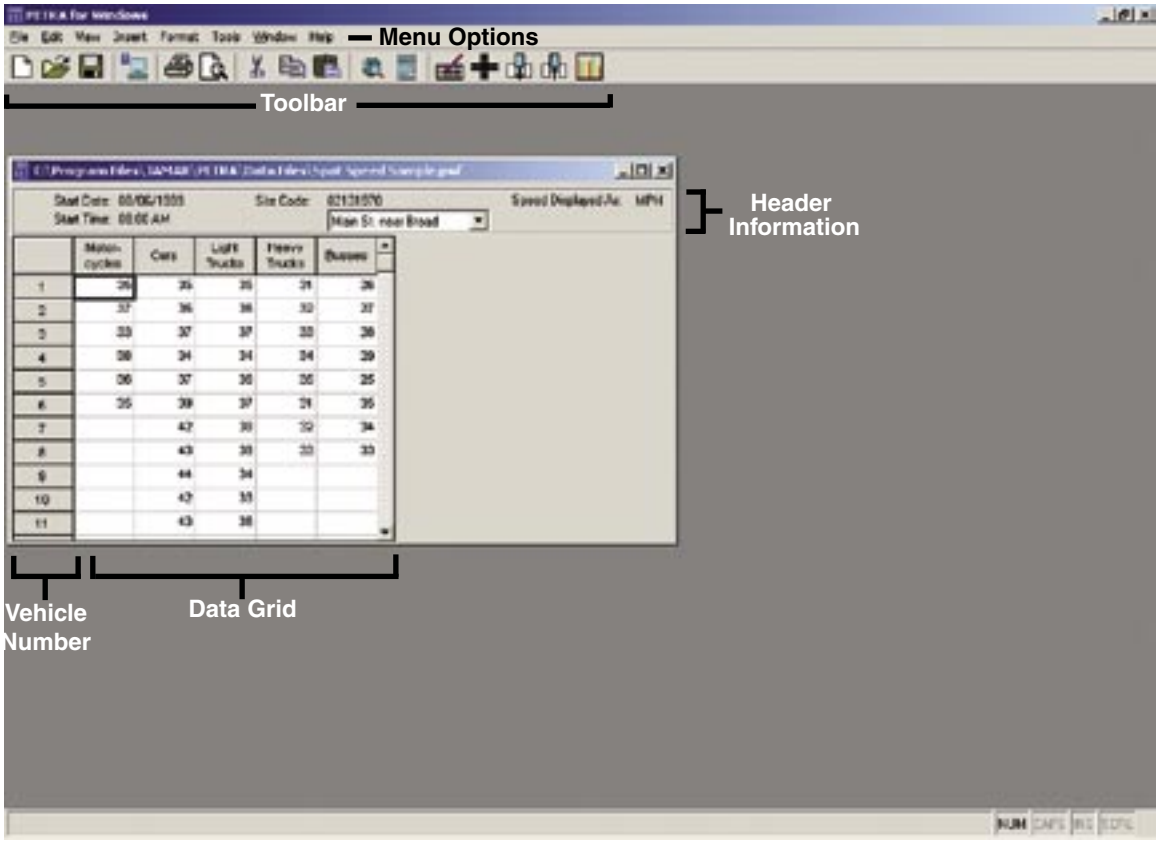


Figure 11-1: Spot Speed File

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 three main areas of information: the Header Information, Vehicle Number and Data Grid. These are shown in figure 11-1 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 figure 11-1 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 figure 11-1, 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 Chapter 4 for more information.

Convert Units

One feature that is unique to Spot Speed files is the *Convert to MPH/KPH* Tool. This Tool, 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

Spot Speed reports are set up in a manner very similar to Turning Movement reports. Refer To Chapter 4 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

#	Motorcycles	Cars	Light Trucks	Heavy Trucks	Busses
1	35	35	35	31	28
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 11-2: 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.

Average Speed – This is derived by adding all the individual speeds within each class, and then

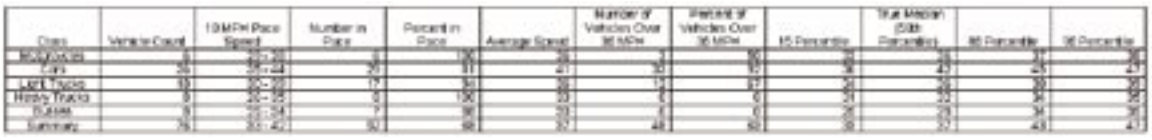


Figure 11-3: Spot Speed Report - Summary

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 – Theses 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 – Theses 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. Refer to page 6.5 for more information on this.

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.

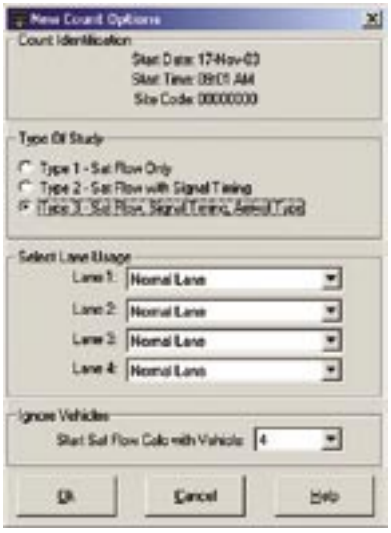


Figure 12-1: Saturation Flow New Count Options

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 12-2 shows an example of a Type 3 data file.

PETRA 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. PETRA 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 vehicle in the queue.

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

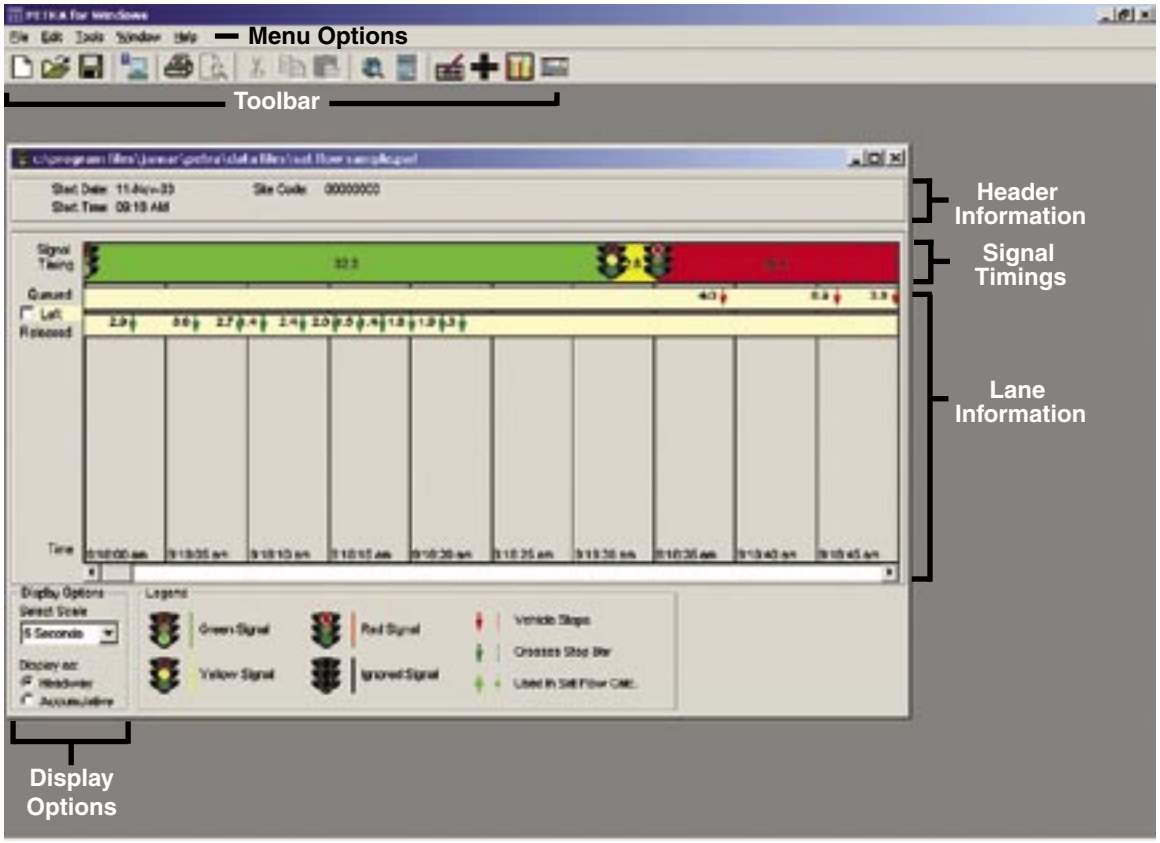


Figure 12-2: Saturation Flow File

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 three main areas of information: the Header Information, Signal Timings and Lane Information. These are shown in figure 12-2 above.

Signal Timings

The signal timigs 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 Chapter 4 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 4 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	30.6

Lane	Join Queue: Accumulative								
1	41.7	47.8	50.5	59.3	66.6	70.1	93.1	98.4	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 12-3: 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.

Troubleshooting

Software Updates

For you are having any trouble using your copy of PETRA, 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**. To check the version of your program, select About from the Help menu.

Error Messages

PETRA 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 PETRA support web page at **www.jamartech.com/PETRAsupport.htm** to see if the error is a known issue.

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 95 or higher Windows operating systems, including 98, NT, ME, 2000 and XP.

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 4. 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?
All JAMAR equipment currently 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.

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?

PETRA 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?

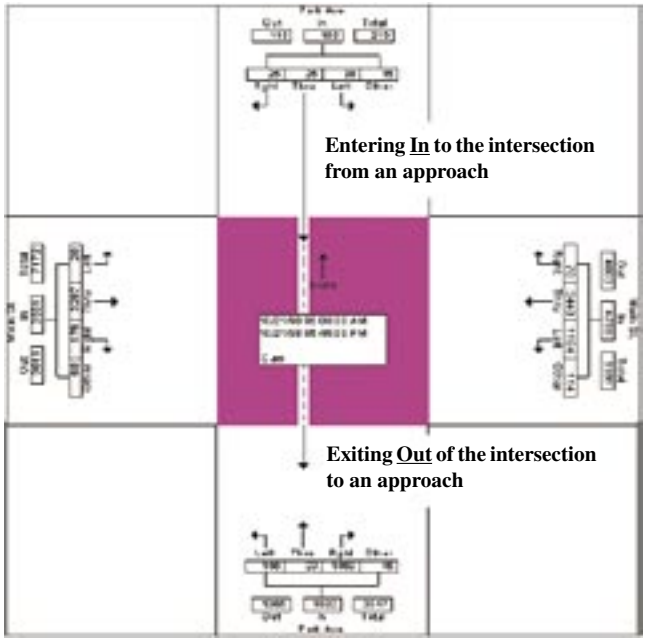
This can occur on some printers if the margins for the report have been set to zero. To correct this, set the left and right margins to a minimum of 0.1. This can be done in the Page tab of the Print Setup.

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?

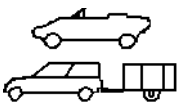
There are several ways to transfer data from PETRA into other programs. The easiest way is to use the Windows Copy and Paste commands. PETRA supports these commands so data can be easily moved out of (or into) the program.

PETRA also contains an Export function that allows data to be saved in several formats, including 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.

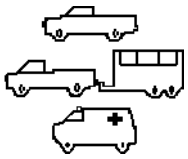
Appendix

Federal Highway Administration Scheme F

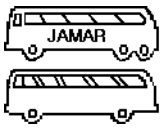
Class 1 - **Motorcycles.** This class includes all two- or three-wheeled motorized vehicles. These vehicles typically have a saddle-type of seat and are steered by handlebars rather than a steering wheel. This includes motorcycles, motor scooters, mopeds, motor-powered bicycles and three-wheel motorcycles.



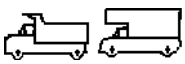
Class 2 - **Passenger cars.** This class includes all sedans, coupes and station wagons manufactured primarily for the purpose of carrying passengers, including those pulling recreational or other light trailers.



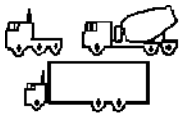
Class 3 - **Pickups, Vans and other 2-axle, 4-tire Single Unit Vehicles.** This class includes all two-axle, four tire vehicles other than passenger cars, which includes pickups, vans, campers, small motor homes, ambulances, minibuses and carryalls. These types of vehicles which are pulling recreational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



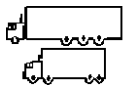
Class 4 - **Buses.** This class includes all vehicles manufactured as traditional passenger-carrying buses with two axles and six tires or three or more axles. This includes only traditional buses, including school and transit buses, functioning as passenger-carrying vehicles. All two-axle, four tire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



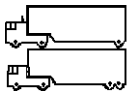
Class 5 - **Two-Axle, Six-Tire Single Unit Trucks.** This class includes all vehicles on a *single frame* which have *two axles and dual rear tires*. This includes trucks, camping and recreation vehicles, motor homes, etc.



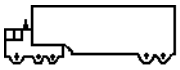
Class 6 - **Three-Axle Single Unit Trucks.** This class includes all vehicles on a *single frame* which have *three axles*. This includes trucks, camping and recreation vehicles, motor homes, etc.



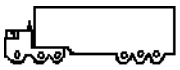
Class 7 - **Four or More Axle Single Unit Trucks.** This class includes all vehicles on a *single frame* with *four or more axles*.



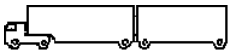
Class 8 - **Four or Less Axle Single Trailer Trucks.** This class includes all vehicles with *four or less axles* consisting of *two units*, in which the pulling unit is a tractor or single unit truck.



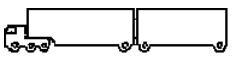
Class 9 - **Five-Axle Single Trailer Trucks**. This class includes all *five-axle* vehicles consisting of *two units* in which the pulling unit is a tractor or single unit truck.



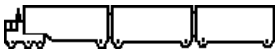
Class 10 - **Six or More Axle Single Trailer Trucks**. This class includes all vehicles with *six or more axles* consisting of *two units* in which the pulling unit is a tractor or single unit truck.



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.

File Utilities

PETRA 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**. The *Save As Type* selection box at the bottom of the Save As screen is used to select the export format. The options are:

Figure A-1: 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 either not using group 3 or combining it with group 2.

Figure A-2: PC-Warrants Export Options

PC-Warrants (*.war) – This will save the data in the format of the DOS PC-Warrants program. *Note that the current Warrants program, PC-Warrants for Windows, does not use this format.* PC-Warrants for Windows directly imports data from PETRA .pwf files. When exporting into this format you are given the option of exporting just the first group, or all groups combined. You are also given the option of exporting the 'Other' keys, which are assigned to Pedestrian volumes in the Warrants file.

Figure A-3: 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-4: 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.

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-5: Registry Entry

PETRA 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 PETRA can be located at:

HKEY_CURRENT_USER, Software, VB and VBA Program Settings, PETRA

Data Formats

The data that is read by PETRA from a hand-held data collector (TDC-12, TDC-8, DB-400, DB-100) is in standard ASCII (text) format. In PETRA, 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 support studies is as follows:

Turning Movements:

^^^^^^^^^^^^^^^^^^^^	leader characters (20)
001	count number
001	interval number
01	interval length (min)
nnnnnnnn	8 digit site code
AAAAAAAAAAAAAAAAAAAA	Alpha site code
AAAAAAAAAAAAAAAAAAAA	(20 characters)
hhmm	start time
mmddyy	start date
nnnn,nnnn,...nnnn	data, 10 per line
...	
ccc	checksum

Classification:

#####################	leader characters (20)
001	count number
001	interval number
01	interval length (min)
nnnnnnnn	8 digit site code
AAAAAAAAAAAAAAAAAAAA	Alpha site code
AAAAAAAAAAAAAAAAAAAA	(20 characters)
s	scheme code
kk	number of classes
hhmm	start time
mmddyy	start date
nnnn,nnnn,...nnnn	data, 10 per line
...	
ccc	checksum

Gap:

@@@@@@@@@@@@@@@@@@@@	leader characters (20)
001	count number
001	interval number
01	interval length
nnnnnnnn	8 digit site code
AAAAAAAAAAAAAAAAAAAA	Alpha site code
AAAAAAAAAAAAAAAAAAAA	(20 characters)
hhmm	start time
mmddyy	start date
nnnn,nnnn,...nnnn	data, 10 per line
...	
ccc	checksum

Intersection Stop Delay:

$$$$$$$$$$$$$$$$$$$$	leader characters (20)
001	count number
001	interval number
01	interval length
nnnnnnnn	8 digit site code
AAAAAAAAAAAAAAAAAAAA	Alpha site code
AAAAAAAAAAAAAAAAAAAA	(20 characters)
hhmm	start time
mmddyy	start date
nnnn,nnnn,...nnnn	data, 10 per line
...	
ccc	checksum

Stop Sign Delay (and Saturation Flow*):

<<<<<<<<<<<<<<<<<<<<	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 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 Saturation Flow format is the same as Stop Sign Delay, with the exception of the Leader Characters. Saturation Flow uses twenty + symbols.

Spot Speed:

!!!!!!!!!!!!!!!!!!!!	leader characters (20)
001	count number
001	interval number
01	interval length (min)
nnnnnnnn	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

Notes:

- Checksum is mod 256 of all characters in interval
- All lines are followed by CR, LF characters
- Last line of data followed by 20 colons ":" (end of data character)