

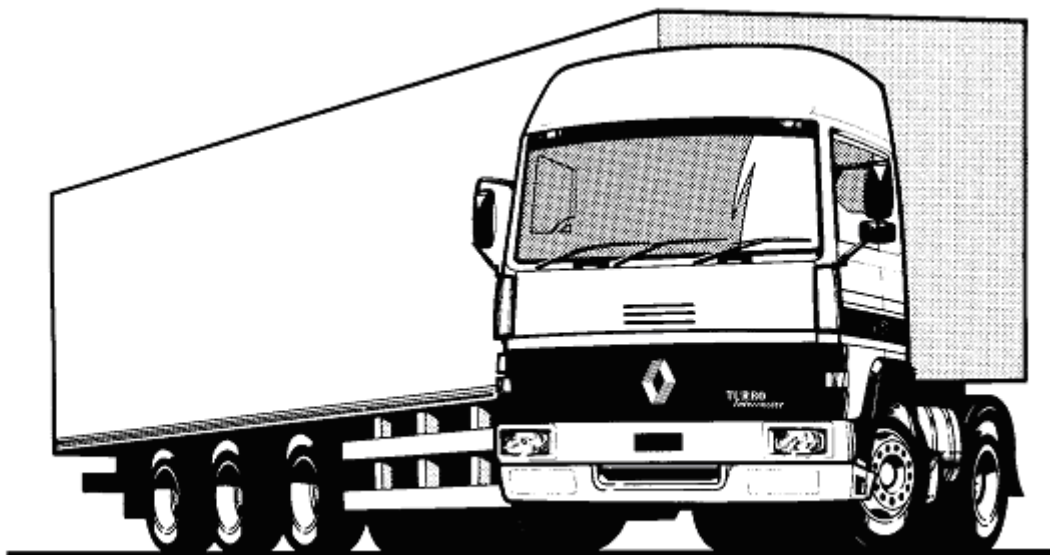
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User Manual for

# AutoTrack

30 August 2012

from Savoy Computing Services Ltd





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**30 August 2012**

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# Installing AutoTrack

Although installation of AutoTrack is relatively easy we nevertheless recommend that it be undertaken only by suitably competent persons.

---

## AutoTrack hardware lock

AutoTrack is protected from illegal use by a hardware lock, a small device that must be plugged into either the parallel port or the USB port of your computer (or, in the case of network licences, file server). Without this device AutoTrack will not run.

### Parallel hardware locks

The parallel port hardware lock may be connected at either end of a parallel printer cable but must be located between the computer and the printer (or plotter, T-switch, buffer etc.). Since the hardware lock will not affect the operation of the parallel port it can be left installed when AutoTrack is not in use.

Whenever possible printers or plotters that are plugged into the same parallel port as the AutoTrack hardware lock should be switched on before the program is used and left on throughout its use.

Up to four Savoy and third party hardware locks, as well as a printer, can be plugged into the same parallel port. However, users should note that whilst all Savoy program hardware locks are compatible with one another, third party hardware locks may cause problems. Such problems can usually be resolved by rearranging the order in which the hardware locks are chained or by plugging them in different ports.

### USB hardware locks

USB hardware locks are becoming the norm with the gradual phasing out of the parallel port. There are fewer problems with USB dongles since they cannot be stacked.

### Important

*Replacement Savoy hardware locks will only be issued to holders of current support and maintenance contracts on return of a damaged hardware lock. If the damaged hardware lock cannot be produced a replacement copy of AutoTrack will have to be purchased.*

---

## Initialising AutoTrack

Before you can use the hardware lock for the first time you will need to initialise it by entering an **Initialisation Keycode**. This code is normally supplied to you once you have confirmed receipt of the software and dongle.

When you run AutoTrack for the first time it will warn you that the dongle has not yet been initialised and prompt you for an initialisation code. Once you have initialised your dongle you may discard the code which you will not need again.

### Note

*The Initialisation Keycode is different from an Update Keycode which can only be used on a dongle that has already been initialised.*

---

## Updating the AutoTrack version

Each time you install a new version of AutoTrack you will need to enter an **Update Keycode**. This code will normally be emailed to you automatically when you download the new version.

To enter the update keycode:-

1. Install the new version of AutoTrack and run it.
2. You will be warned that you are not authorised to use this version and prompted to enter an update code.
3. Follow the prompts and enter the supplied keycode.

The update code changes the authorised version held in the dongle so once you have successfully applied the code you will not need to enter it again, even if you move the dongle to another computer.

### Note

*The update code changes with every version and once successfully applied may be discarded.*

---

## Upgrading AutoTrack functionality

The AutoTrack modules that you are able to use are controlled by the hardware lock. Extra modules, if purchased, may be activated by entering an **Upgrade Keycode**. This code will be supplied by Savoy once we have your confirmed order for additional modules. However, before we can generate the code we need the **User Code** from your installation.

To locate the User Code:-

1. Run Start > Programs > AutoTrack > Hardware Lock Manager.
2. Click **Search for Savoy hardware locks** to locate your dongle.
3. Select the dongle and click **Details**.
4. The **User Code** is the second item down.

To enter the Upgrade Keycode:-

1. Run Start > Programs > AutoTrack > Hardware Lock Manager.
2. Click **Search for Savoy hardware locks** to locate your dongle.
3. Select the dongle and click **Update**.

4. Follow the prompts and enter the supplied keycode.

---

## Licences

Depending upon your licence you may be able to run AutoTrack on more than one computer.

### Single user licences

You may install the software on as many machines as you wish but will only be able to run it on computers running 32-bit or 64-bit Windows with an AutoTrack hardware lock plugged into the parallel or USB port.

### Network licences

You may install the software on as many machines as you wish but will only be able to run it on computers running 32-bit or 64-bit Windows that have a network link to the server that has the hardware lock plugged into its parallel or USB port.

### Trial copies

Trial copies of AutoTrack may be issued with a licence that has a limited life. Once the licence expires the protection system will prevent the program from operating.

To convert an evaluation copy to the full version or to extend the evaluation period, the software will need to be relicensed. Relicensing involves issuing a new hardware lock or authorisation code.

### Demonstration copies

Demonstration copies do not require a hardware lock because they distort the vehicles randomly thereby rendering them useless for real work. You may install demo copies on as many computers as you wish.

### Rental licences

Rental licences use a software licence which can be purchased and extended online. No physical lock is required but an internet connection is required. You may install AutoTrack on as many computers as you wish and the licence can be transferred between installations.

---

## Installing the software

AutoTrack can be installed with either a single user hardware lock, which should be plugged into the computer being used, or with a network hardware lock which may be plugged into a computer remote from the one in use.

The software is available on CD or as either a Windows Installer (msi) file or a standalone self-extracting (exe) file.

The installer files have names of the form **ATRxxx.EXE** or **ATRxxx.MSI** where **xxx** is the version number, e.g. **ATR922.EXE**. Note that these files contain the full product and will install a full copy or update an existing copy.

The CD contains some additional utilities and has a navigation menu but otherwise the AutoTrack product is identical.

### Note

*You can configure AutoTrack to warn you when updates become available. If you download these updates they are placed in the **My Documents\My AutoTrack Data\Updates** folder. If you obtain updates by visiting the web site we recommend that you place these files in the same area.*

## Single user version

1. Switch on the computer.
2. **Do not plug the dongle in yet.** If you have already plugged it in then unplug it before proceeding.
3. Login to Windows making sure that you have **Administrator** rights and check that there is 600MB (max) free for the program files.
4. **If you have a CD**  
Insert the AutoTrack CD and when it starts select **Install / Update / Remove AutoTrack**. When Setup starts follow the prompts to install AutoTrack, selecting the **Express** install option. See [Installing, modifying, repairing or removing AutoTrack from a CD or from a self-extracting installer \(exe\) file](#), later in this section, to perform a **Custom** install or for more details.

### If you have a self-extracting (exe) file

Double click on the file. When Setup starts follow the prompts to install AutoTrack, selecting the **Express** install option. See [Installing, modifying, repairing or removing AutoTrack from a CD or from a self-extracting installer \(exe\) file](#), later in this section, to perform a **Custom** install or for more details.

### If you have a Windows Installer (msi) file

Double click on the file. When Setup starts follow the prompts to install AutoTrack, selecting the **Typical** install option. See [Installing, modifying, repairing or removing AutoTrack from a Windows Installer \(msi\) file](#), later in this section to perform a **Custom** install or for more details.

5. Shut down the PC, plug in the dongle and restart the computer.

### USB dongles only

*If you plugged in the dongle before installing the software it probably will not be installed correctly. Refer to [Removing a partially installed USB dongle](#) to remove and reinstall it.*

#### **Parallel dongles only**

*If you have a printer connected on the same port, switch that on first, and then the computer. If you have other hardware locks connected on the same port you may need to experiment with the order.*

6. If you opted to configure your system manually then carry out any manual configuration (see [Configuring AutoCAD manually](#) or [Configuring MicroStation, Bentley PowerDraft, PowerCivil, Power InRoads, Power GEOPAK or MX manually](#) later in this section).
7. Repeat for any other computers on which you want to be able to run AutoTrack.

### **Removing a partially installed USB dongle**

1. Unplug the USB dongle.
2. Run the Hardware Lock Wizard and if there is a driver installed, click the **Uninstall Driver** button.
3. Rerun the Hardware Lock Wizard and click the **Install Driver** button.
4. Plug the USB dongle in.
5. Click **Search for Savoy Hardware Locks** to check that the dongle can be found.
6. Close the Hardware Lock Wizard.

## **Network version**

### **Warning**

The installation of the network version of AutoTrack should be carried out by a network administrator or system supervisor.

1. Decide which computer you will install the hardware lock on (the licence server) bearing in mind that this computer must be left switched on and possibly logged in at all times. We recommend that this is neither a file server nor an AutoTrack client and we do not recommend installing the network hardware lock on computers running Windows 98.
2. Login to Windows making sure that you have **Administrator** rights.
3. Install the NetHASP Licence Manager software (see [Installing the NetHASP Licence Manager software \(Network version only\)](#)).
4. **USB dongle**  
Plug the hardware lock into the USB port.

### **Parallel dongle**

Close down and switch off the computer. Plug the hardware lock into the parallel port and then restart it.

### **Note**

If you have a printer connected then switch that on first and then the computer. If you have other hardware locks connected then you may need to experiment with the order.

5. The optional NetHASP Licence Monitor allows you to monitor licence usage and may be installed on any computer, including the server if you wish (see [Installing the NetHASP Licence Monitor software \(Network version only\)](#)).
6. Go to first of the computers on which you wish to install AutoTrack, login to Windows making sure that you have **Administrator** rights, and check that there is approximately 600MB (max) free on the installation drive for the program files.
7. **If you have a CD**  
Insert the AutoTrack CD and when it starts select **Install / Update / Remove AutoTrack**. When Setup starts follow the prompts to install AutoTrack, selecting the **Express** install option. See [Installing, modifying, repairing or removing AutoTrack from a CD or from a self-extracting installer \(exe\) file](#), later in this section, to perform a **Custom** install or for more details.

**If you have a self-extracting (exe) file**

Double click on the file. When Setup starts follow the prompts to install AutoTrack, selecting the **Express** install option. See [Installing, modifying, repairing or removing AutoTrack from a CD or from a self-extracting installer \(exe\) file](#), later in this section, to perform a **Custom** install or for more details.

**If you have a Windows Installer (msi) file**

Double click on the file. When Setup starts follow the prompts to install AutoTrack, selecting the **Typical** install option. See [Installing, modifying, repairing or removing AutoTrack from a Windows Installer \(msi\) file](#), later in this section to perform a **Custom** install or for more details.

8. If you opted to configure your system manually then carry out any manual configuration (see [Configuring AutoCAD manually](#) or [Configuring MicroStation, Bentley PowerDraft, PowerCivil, Power InRoads, Power GEOPAK or MX manually](#)).
9. If you want to be able to monitor licence usage from this computer, install the NetHASP Licence Monitor (see [Installing the NetHASP Licence Monitor software \(Network version only\)](#)).
10. Repeat steps 6 to 11 for any other computers on which you want to be able to run AutoTrack.

---

## Installing the NetHASP Licence Manager software (Network version only)

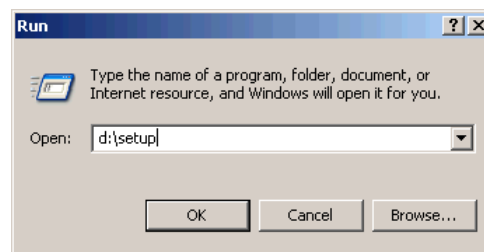
The network licence manager can be installed on a Windows NT/2000/XP/7 network or a Novell Netware network. We do not recommend that it be installed on a computer running Windows 98.

### Warning

*The installation of the hardware lock on a network server should be carried out by a network Administrator or system supervisor.*

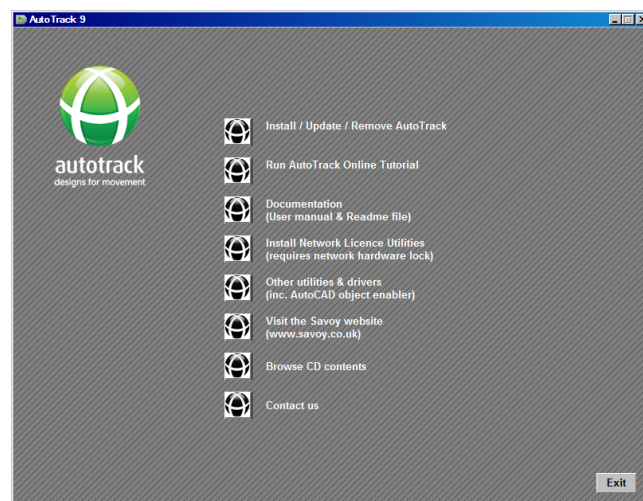
## Installing the licence manager on a Windows NT/2000/XP/7 server

1. **Do not plug in the hardware lock** until you have installed the licence manager.
2. Insert the CD in the CD ROM drive. The CD will start automatically if autorun is enabled and you can proceed to step 5. If the CD does not start automatically then proceed as follows:-
3. Click the **Start** button and select Run. The Run dialog will appear.



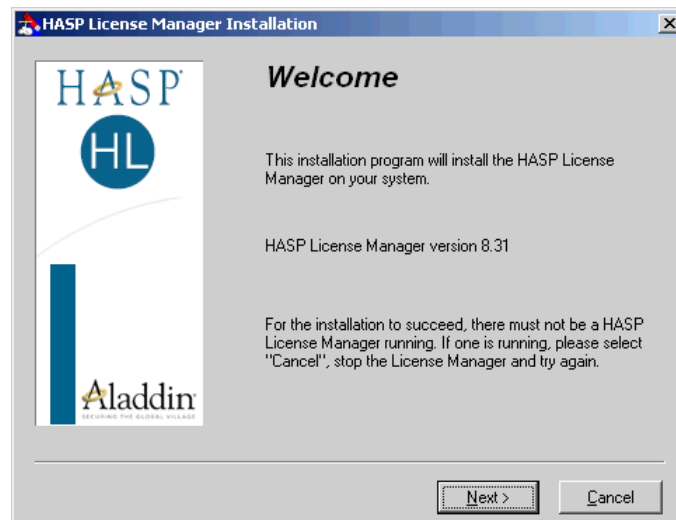
Windows 2002 Run dialogue

4. Type **d:setup** (change the drive letter to suit your CD) and click on **OK**.
5. The CD browser will appear.



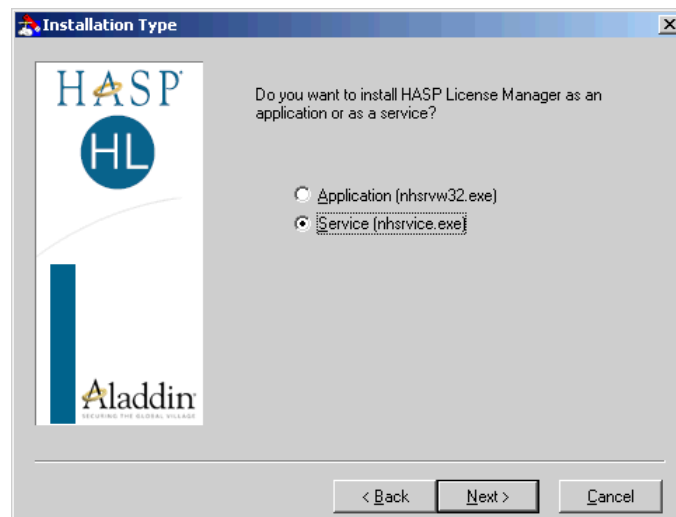
CD Browser

6. Click Install Network Utilities and then Install NetHASP Licence Manager on a Win32 computer.
7. The HASP Licence Manager Installation screen will appear.



NetHASP Licence Manager Installation dialog

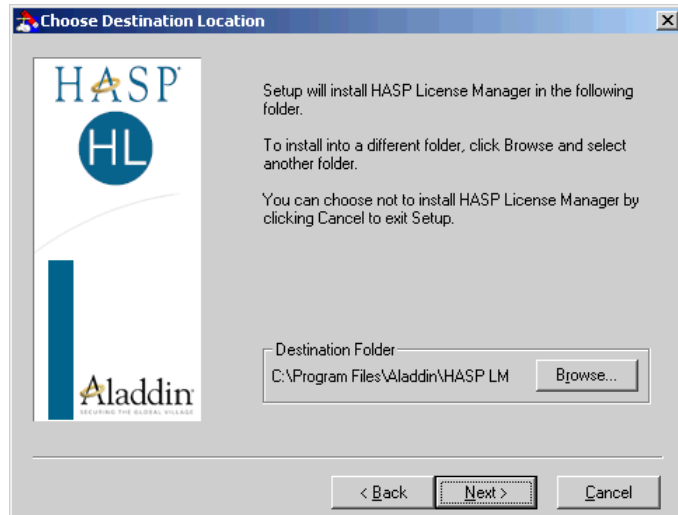
8. Click **Next**. Accept the Aladdin licence agreement. The Installation Type dialog will appear.



NetHASP Licence Manager Installation Type dialog

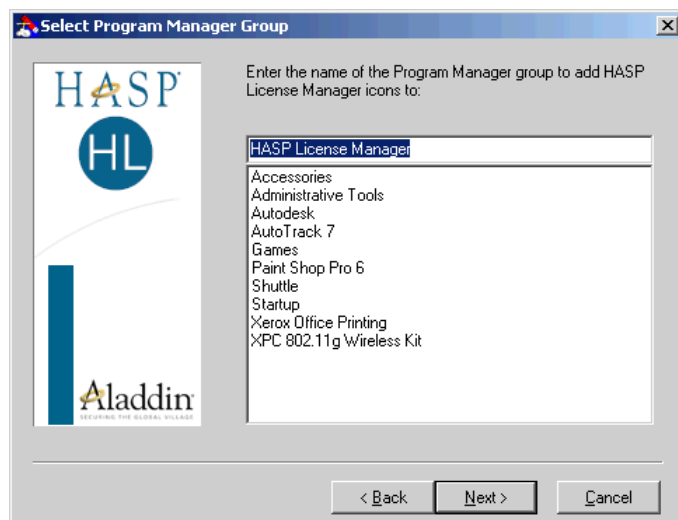
9. We recommend that you select the **Service** setup. This will install the Licence Manager as an NT service and mean there is no need to log in to the computer to use the Licence Manager. If your operating system does not allow you to install the Licence Manager as a service then select the **Application** setup.
10. Click **Next**. The Choose Destination Directory dialog will appear.





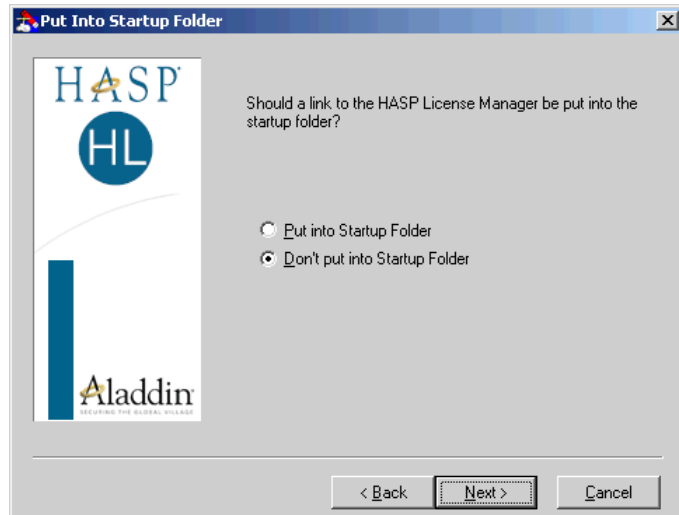
NetHASP Licence Manager Choose Destination Directory dialog

11. If you wish to change the default location then click **Browse** and select your preferred directory.
12. Click **Next**. The Select Program Manager Group dialog will appear.



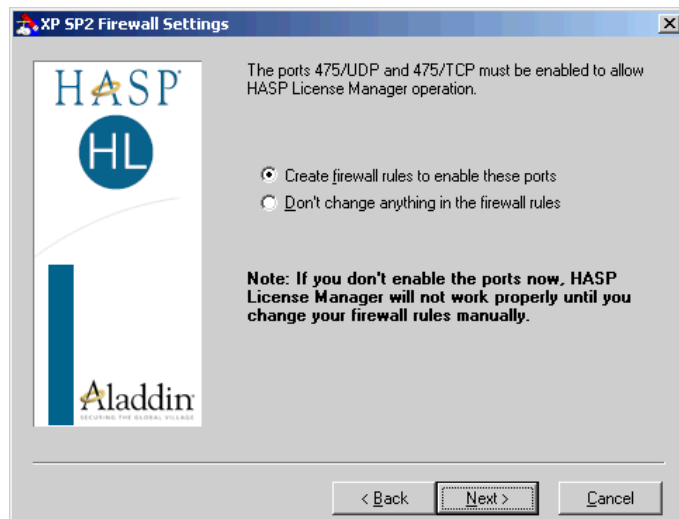
NetHASP Licence Manager Select Program Manager Group dialog

13. Select your preferred group.
14. Click **Next**. At this point, if you opted (contrary to our recommendation) to install the Licence Manager as an application, the Put Into Startup Folder dialog will appear.



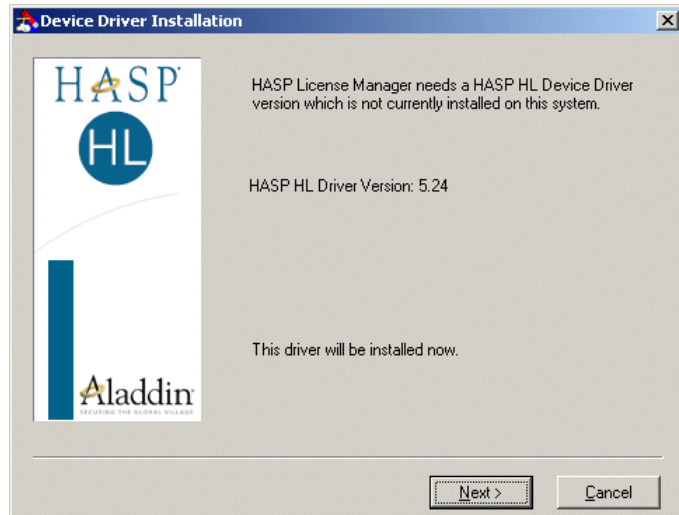
NetHASP Licence Manager Put Into Startup Folder dialog

15. Select **Put into Startup Folder** if you want the licence manager to start automatically when the computer is rebooted.
16. Click **Next**. If you have a firewall enabled that would stop the licence manager from working then the XP SP2 Firewall Settings dialog will appear.



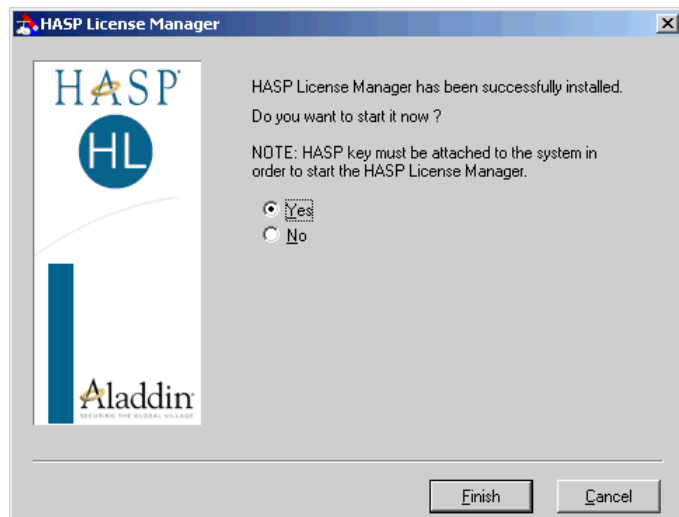
NetHASP Licence Manager XP SP2 Firewall Settings dialog

17. If you do not allow Setup to create the necessary firewall rules then you will have to set them up manually or AutoTrack will not work.
18. Click **Next**. The installation process will now start.
19. When the installation has finished the Device Driver Install dialog will appear (note that you may not see this screen if you already have a suitable device driver installed) and you will be given the opportunity to install the HASP device drivers.



NetHASP Licence Manager Driver Install dialog

20. The HASP device driver must be installed before the system will work so we recommend that you click **Next** to install them now. You should see a message that the hardware lock drivers have been successfully installed.
21. Click **Next**. The Start Licence Manager dialog will appear.



NetHASP Licence Manager Start Manager dialog

22. Make certain that the correct hardware lock is plugged in. The licence manager will not start unless the key is attached.
23. Select **Yes** to start the Licence Manager and then click **Finish**.
24. At this stage if you are using a USB dongle it should be glowing to indicate that it is working.

## Installing the licence manager on a Novell Netware server

### Warning

The Licence Manager will only work on servers which have IPX installed. You should use the Win32 Licence Manager for Netware IP installations.

1. Plug the hardware lock into the parallel port of your Novell Netware file server.
2. Copy the file `HASPSERVE.NLM` to the system directory of the file server.
3. To load the Licence Manager type
4. `load haspserv`
5. To remove the Licence Manager type
6. `unload haspserv`
7. To load the Licence Manager automatically, add the line
8. `load haspserv`
9. to the file `AUTOEXEC.NCF` in the `sys:system` directory.

---

## Moving the NetHASP Licence Manager (Network version only)

If you wish to move the network hardware lock to a different server then proceed as follows:-

1. Uninstall or disable the NetHASP Licence Manager on the original server.
2. Install the NetHASP Licence Manager software on the new server as described above.
3. There is no need to enter a new authorisation keycode unless you have updated AutoTrack.
4. If you have set up AutoTrack to look for the licence manager at a specific IP address, you will need to update these now.

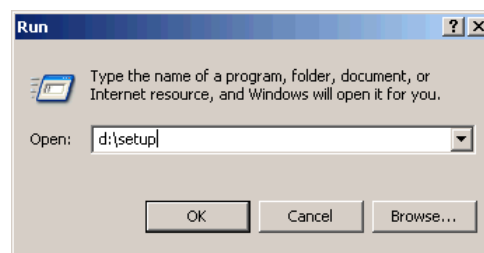
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## Installing the NetHASP Licence Monitor software (Network version only)

The Licence Monitor can be installed on any computer on any computer on the network and allows users to see how many licences are currently available.

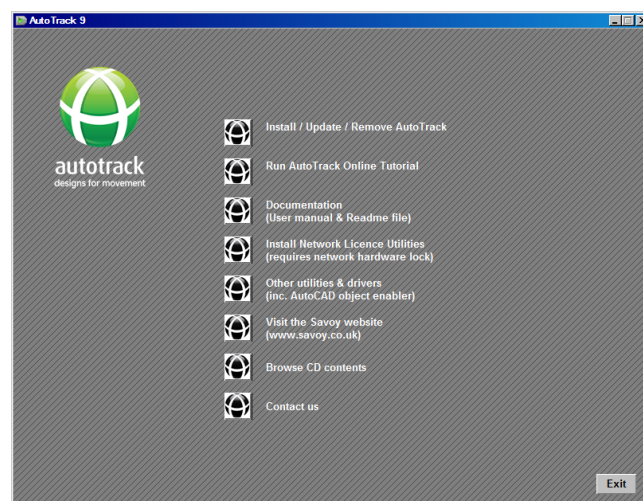
### Installing the licence monitor on a Windows NT/2000/xp client computer

1. Insert the CD in the CD ROM drive of the chosen client computer. The CD will start automatically if autorun is enabled and you can proceed to step 4. If the CD does not start automatically then proceed as follows:-
2. Click the **Start** button and select Run. The Run dialog will appear.



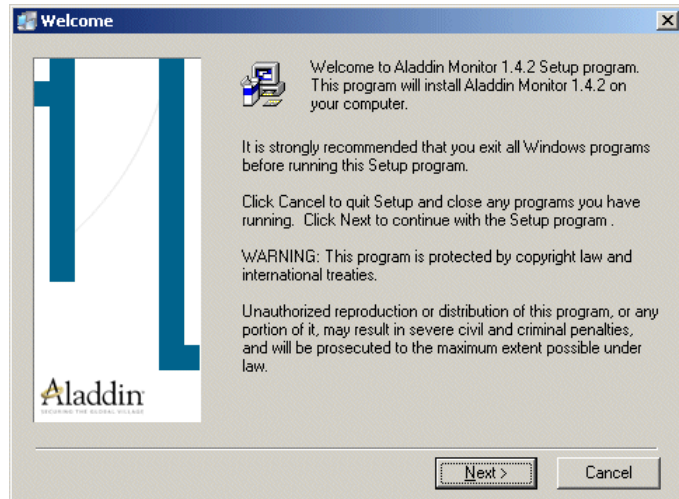
Windows 2002 Run dialogue

3. Type **d:\setup** (change the drive letter to suit your CD) and click on **OK**.
4. The CD browser will appear.



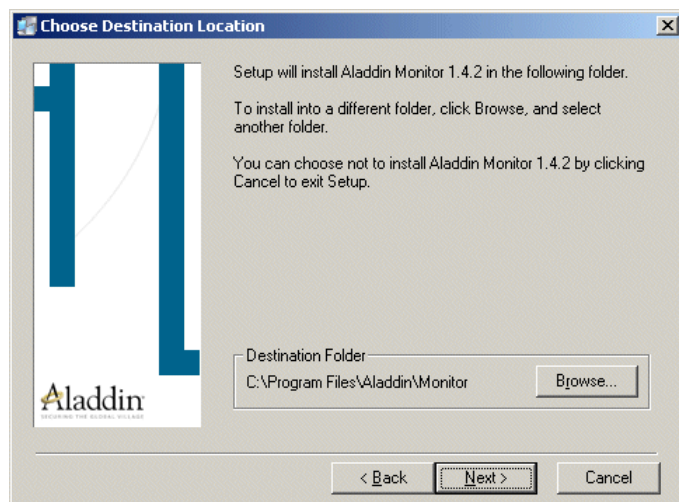
CD Browser

5. Click Install Network Utilities and then Install NetHASP Licence Monitor on a Win32 computer.
6. The Welcome dialog will appear.



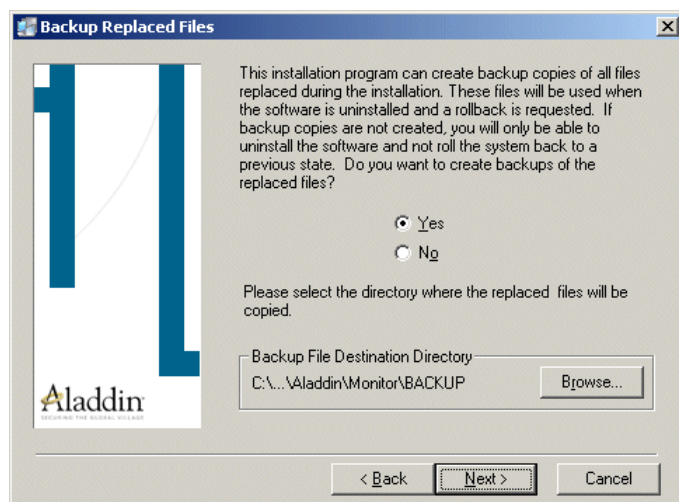
Welcome dialog

7. Click **Next**. Accept the Aladdin licence agreement and click **Next**. The Choose Destination Location dialog will appear.



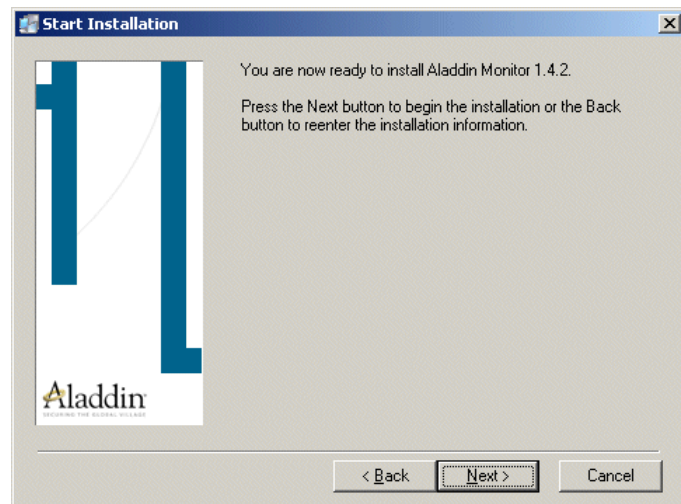
Choose Destination Location dialog

8. If you wish to change the default location then click **Browse** and select your preferred directory.
9. Click **Next**. The Backup Replaced Files dialog will appear.



Backup Replaced Files dialog

10. We recommend that you opt to backup replaced files so that, in the event of a problem, you can reinstate your computer to the state it was revert to the prior to installing the software.
11. Click **Next**. The Start Installation dialog will appear.



Start Installation dialog

12. Click **Next** to begin the installation.
13. Once installed the Monitor can be run by selecting **Start, Programs, Aladdin, Monitor, AKS Monitor**.

---

# Installing, modifying, repairing or removing AutoTrack from a Windows Installer (msi) file

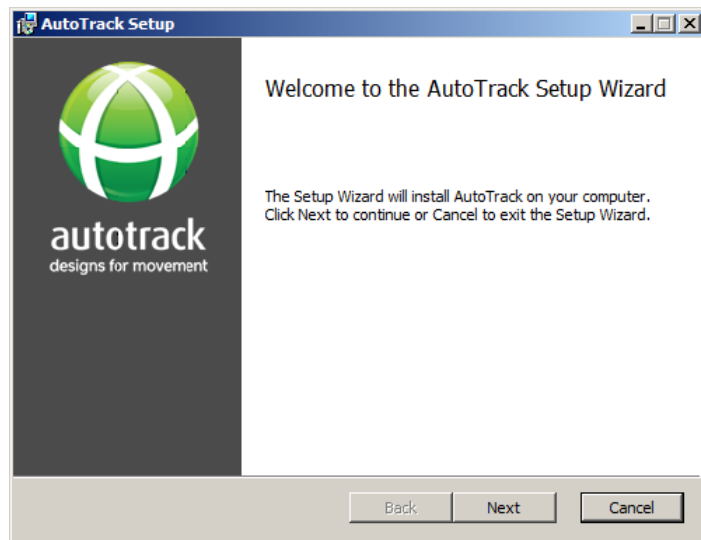
Run Windows as you normally would and follow the steps according to the media type.

## Note

*Windows NT users MUST be logged in with Administrator rights to install or update AutoTrack.*

## Installing AutoTrack

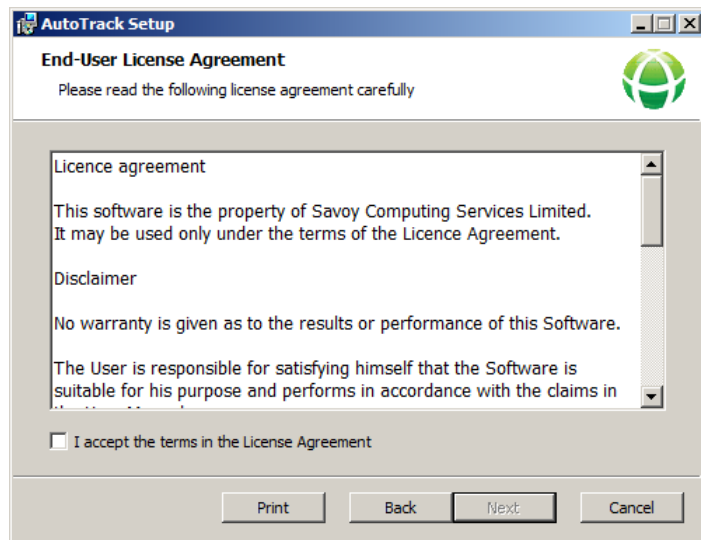
1. If you have downloaded a Windows Installer copy of AutoTrack you will have a file with a .msi extension. The name of this file is version specific but the file for v10.00 is called atr1000.msi. If you cannot see the file extension and have two files that appear to have the same name look for the one whose type is **Windows Installer Package**. Double click on the file. The Welcome dialog will appear.



AutoTrack Setup Welcome dialog

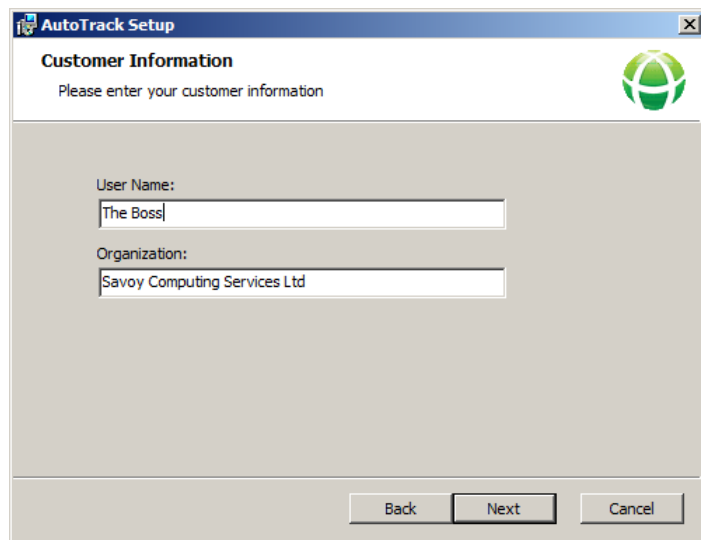
2. Click **Next**. The End-User Licence Agreement dialog will appear.





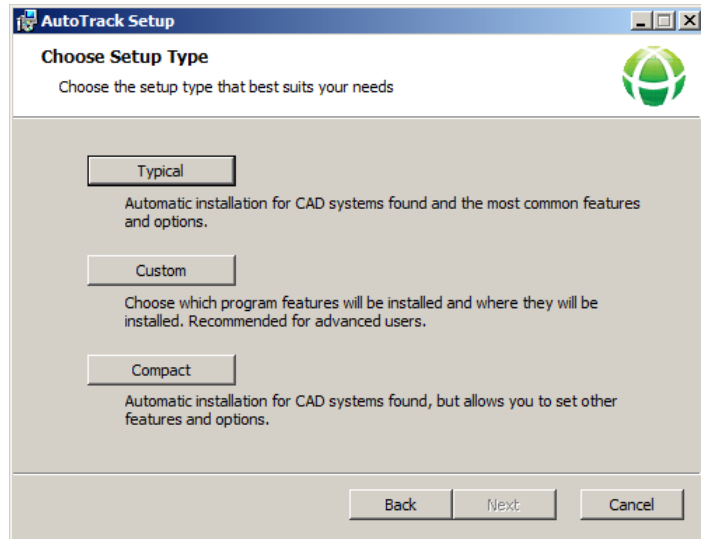
End-User Licence Agreement dialog

3. Tick **I accept the terms in the licence agreement** and click **Next**. The Customer Information dialog will appear.



Customer Information dialog

4. Enter your details and click **Next**. The Setup Type dialog will appear.



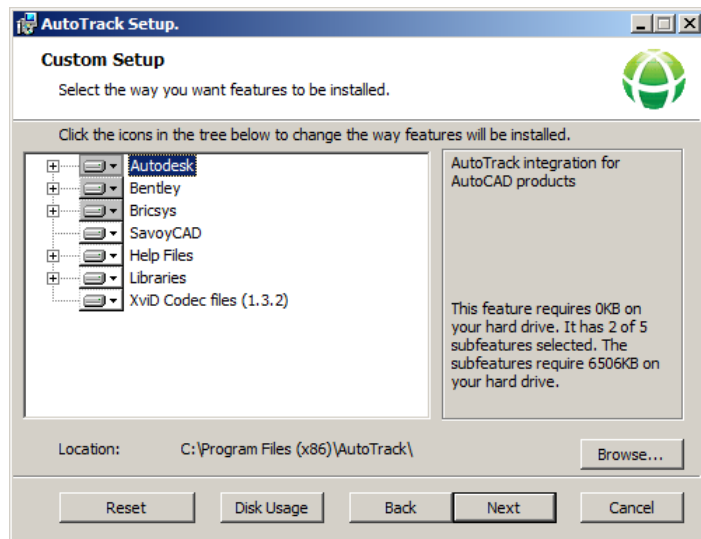
Setup Type dialog

5. Select **Typical** to install AutoTrack on all available platforms. On AutoCAD platforms AutoTrack will be installed on the AutoTrack profile (which will be created if necessary). Update checking will be enabled. The XviD compression codec will be installed. Adobe Acrobat Reader will be installed if necessary. Go to step 42.

Select **Custom** to choose which platforms you want to install or to exclude certain options. Go to step 6.

Select **Compact** if you want to install AutoTrack on all CAD systems found but want to specify the options. This option is ideal for creating silent script installs. Go to step 10.

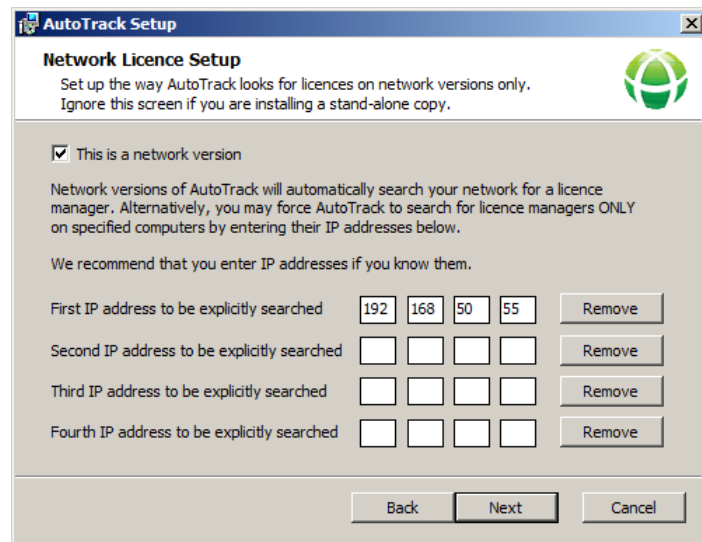
6. The Custom Setup dialog will appear.



Custom Setup dialog

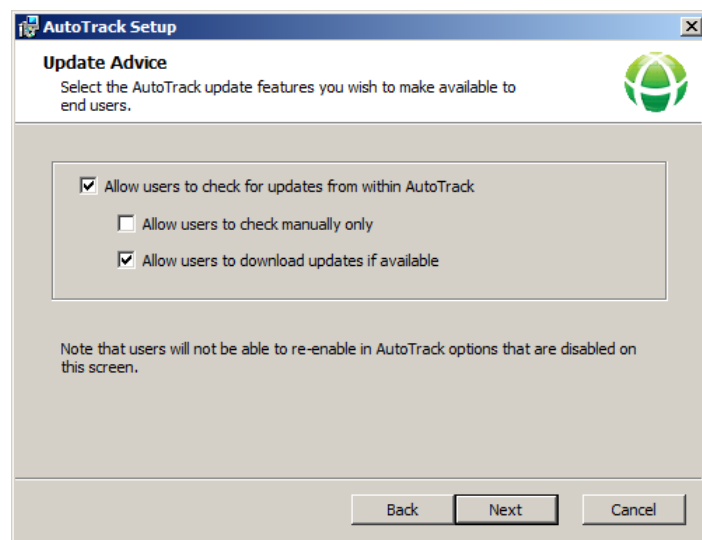
7. Select and/or deselect the features you require from the tree view. Note that AutoTrack Setup pre-selects all CAD systems it finds on your computer.
8. Click **Reset** if you wish to return to the default selections.
9. The default install location is displayed just above the buttons. If you wish to change this, click **Browse** and select an alternative.

10. Click **Next**. The Network Licence Setup dialog will appear.



Network Licence Setup dialog

11. Only tick **This is a network version** if you have a network hardware lock. Otherwise untick this option.
12. By default network versions of AutoTrack search for a network licence manager and maintain a search list automatically. We recommend that you use this default functionality. However, you may, if you wish, enter the IP addresses of up to four licence manager servers on this dialog. These addresses can also be maintained from AutoTrack.
13. Click Next. The Update Advice dialog will appear.



Update Advice dialog

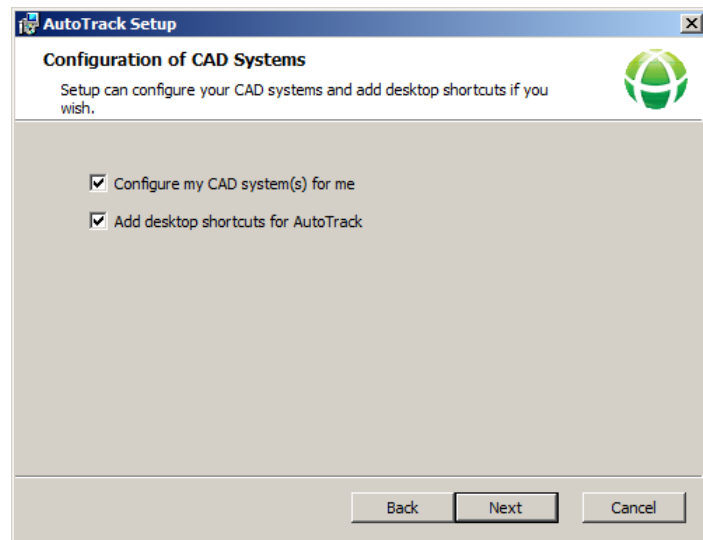
14. By default end users have options to check for more recent versions of AutoTrack either automatically (at a specified time interval) or manually.

If you wish to prevent users from checking for updates entirely then untick **Allow update checking**.

If you wish to only allow them to perform manual checks then tick **Allow manual check only**.

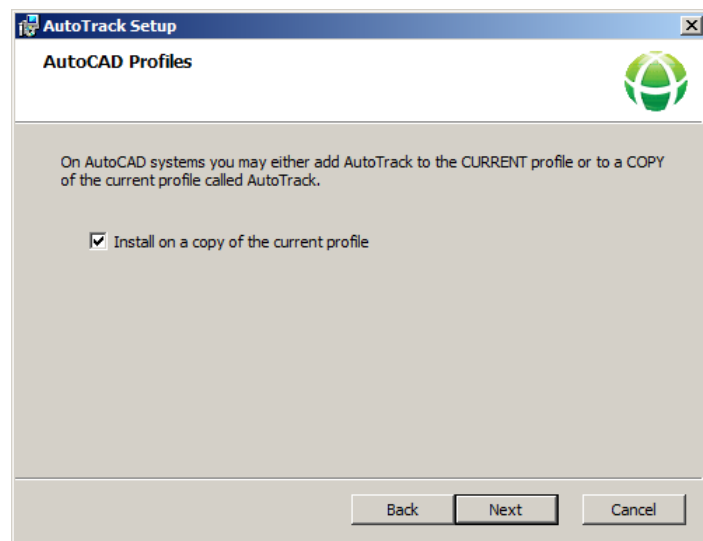
Finally, to allow them to check for updates but prevent them from downloading the file untick **Allow downloads**.

15. Click **Next**.



Configuration of CAD Systems dialog

16. You may either allow Setup to configure your CAD systems now or leave it until the first time the software is run. We recommend that you allow Setup to configure your CAD system so that when subsequently uninstall the software all settings and registry changes are reinstated. If you tick **Add desktop shortcuts for AutoTrack** Setup will add a shortcut icon for each platform that you have selected. Tick the options you require.
17. Click **Next**. If you have allowed Setup to configure your CAD systems then the AutoCAD Profiles dialog will appear.

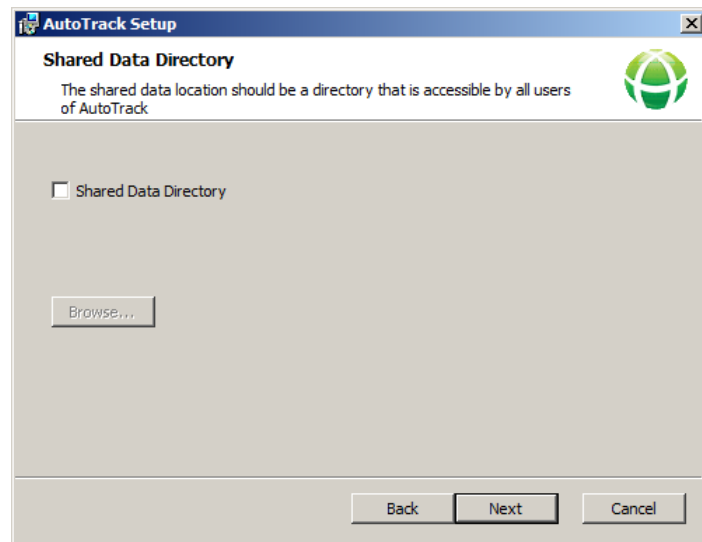


AutoCAD Profiles dialog

18. On AutoCAD you can opt to install AutoTrack onto a copy of the current profile called AutoTrack or directly onto the current profile. By default it is installed on a copy of the current profile. Untick **Install on a copy of the current profile** if you want to add AutoTrack to the current profile. If a profile called AutoTrack already exists, AutoTrack will be added to it. If you opted to

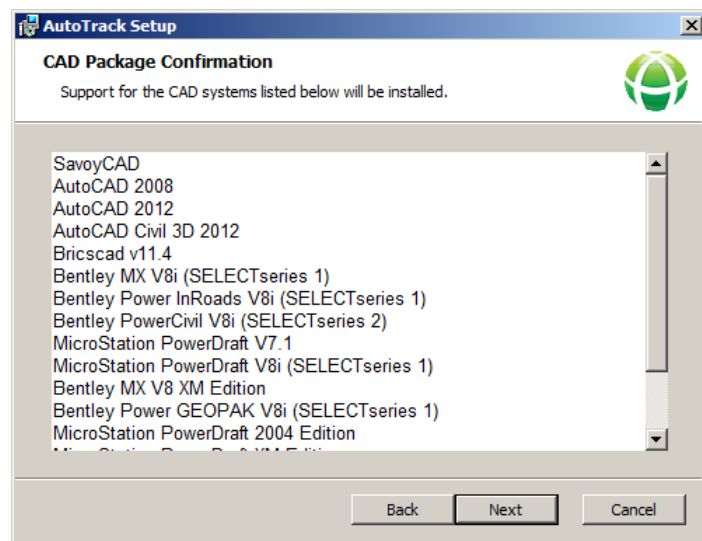
manually configure your system then AutoTrack will be installed onto the current AutoCAD profile each time it is run if necessary.

19. Click **Next**. The Shared Data Directory dialog will appear.



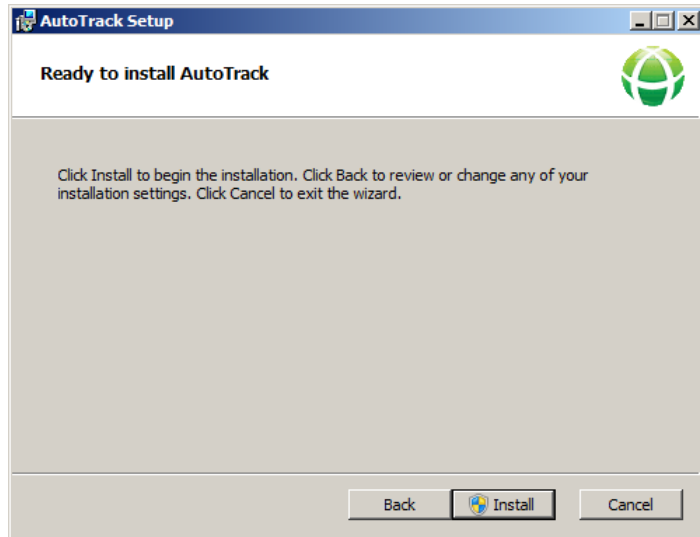
Shared Data Directory dialog

20. Tick **Shared Data Directory** if you wish to allow your users to share data within your organisation. The default shared data directory will be displayed just above the Browse button.
21. To change the directory, click **Browse** and browse to the required directory.
22. Click **Next**. The CAD Package Confirmation dialog will appear.



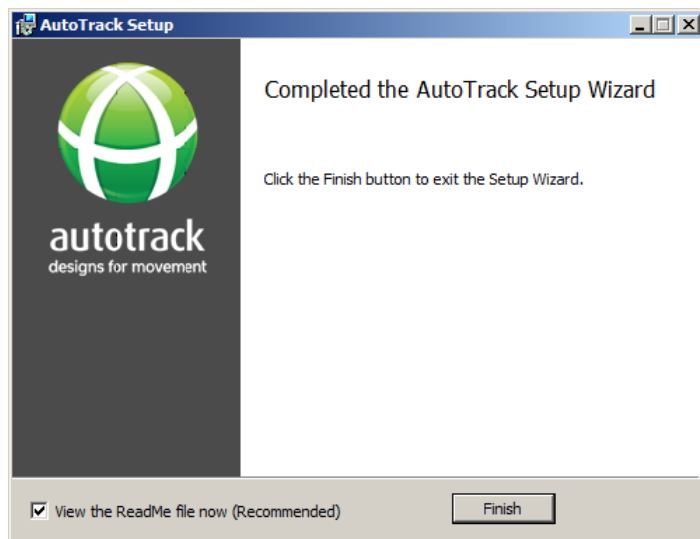
CAD Package Confirmation dialog

23. Double check that you are installing the correct versions and click **Next**. The Ready to install AutoTrack dialog will appear.



Ready to Install AutoTrack dialog

24. Click **Install** to start the installation process.
25. When file copying is finished the Completed dialog will appear.



Completed dialog

26. The readme file lists new features and bugs fixed in the new version.
27. Click **Finish**.

## Modifying, repairing or removing AutoTrack

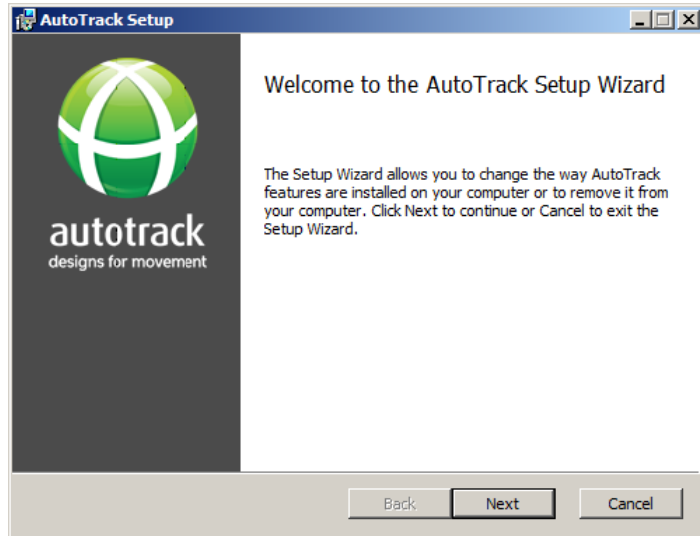
### Tip

*We strongly recommend that you configure your copy of AutoTrack via the AutoTrack entry in the **Programs and Features** applet (or, on older copies of Windows, the **Add/Remove Programs** applet) in Control Panel. Alternatively, proceed as follows:-*

1. If you have downloaded a Windows Installer copy of AutoTrack you will have a file with a .msi extension. The name of this file is version specific but the file for v10.00 is called atr1000.msi. If you cannot see the file extension and have two files that appear to have the same name look for the one whose type is **Windows Installer Package**. Double click on the file.

2. If you see the Welcome to the AutoTrack Setup New Install dialog then you do not have a copy of AutoTrack installed on your computer. Refer to [Installing AutoTrack](#).

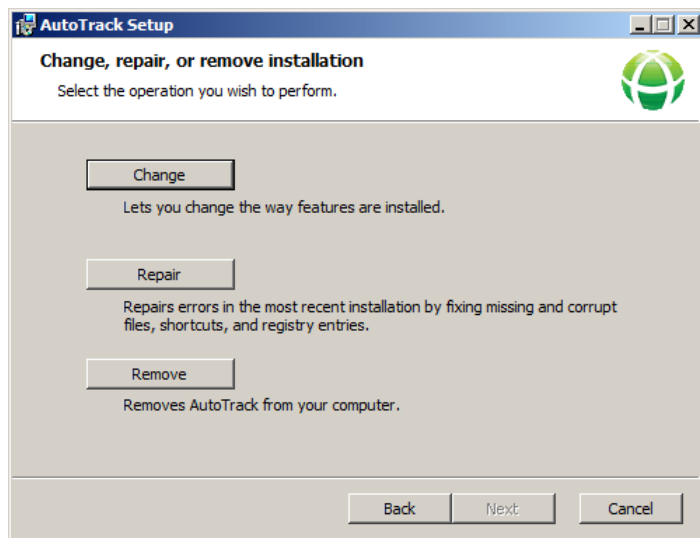
Otherwise the Welcome to the AutoTrack Setup Maintenance dialog will appear.



Welcome to the AutoTrack Setup Maintenance dialog

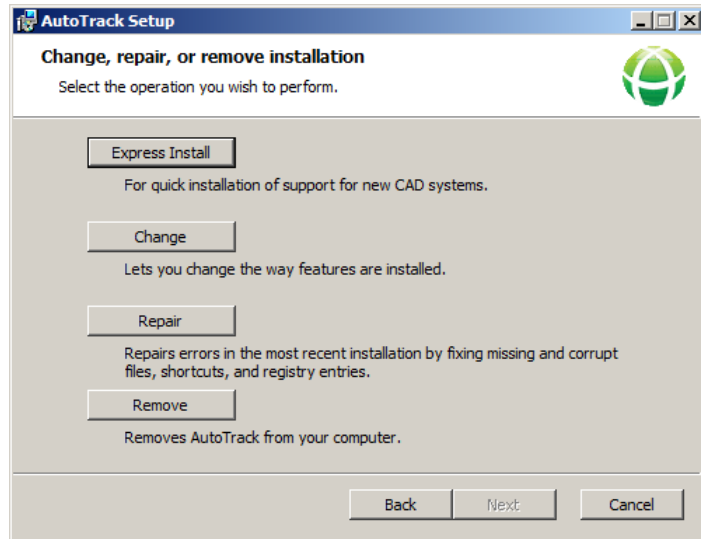
If you also get a message ***'Another version of this product is already installed...'*** then you either have a different version of AutoTrack installed or it was installed by a different installer. We recommend that you configure or remove the software via the AutoTrack entry in the Programs and Features applet in Control Panel. Alternatively, obtain a copy of the original installer.

3. Click **Next**. The **Change, repair or remove installation** dialog will appear.



Change, repair or remove installation dialog

If you have installed new CAD systems since you installed AutoTrack, or if you did not originally install AutoTrack on all CAD systems on your computer, then you will have an extra option to **Express Install** support for the new CAD systems.



Change, repair or remove installation dialog

4. If you just want to add AutoTrack support for newly installed CAD systems then click **Express Install**. Setup will update your system and close when it has finished.

If you wish to add or remove support for a specific CAD system or to add or remove other program files (e.g. the on-line manual) select **Change**. Refer to step 6 onwards in [Installing AutoTrack](#).

If you have reason to believe that a file is missing or has become corrupted then select **Repair**. This will reinstall all the files installed by the previous setup to the same location.

If you wish to remove AutoTrack from your computer select **Remove**. You will be asked to confirm and then AutoTrack will be removed and Setup will close.



---

# Installing, modifying, repairing or removing AutoTrack from a CD or from a self-extracting installer (exe) file

Run Windows as you normally would and follow the steps according to the media type.

## Note

*Windows NT users MUST be logged in with Administrator rights to install or update AutoTrack.*

## Installing AutoTrack

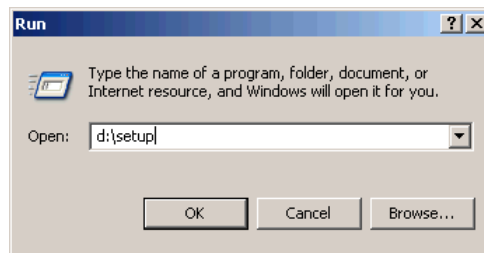
1. **If you have downloaded a self-extracting installer copy of AutoTrack**

You will have a file with a .exe extension. The full name is version specific but the file for v10.00 is called atr1000.exe. If you cannot see the file extension and have two files that appear to have the same name look for the one whose type is **Application**. Double click on the file to start the install and go to step 6.

### If you have an AutoTrack CD

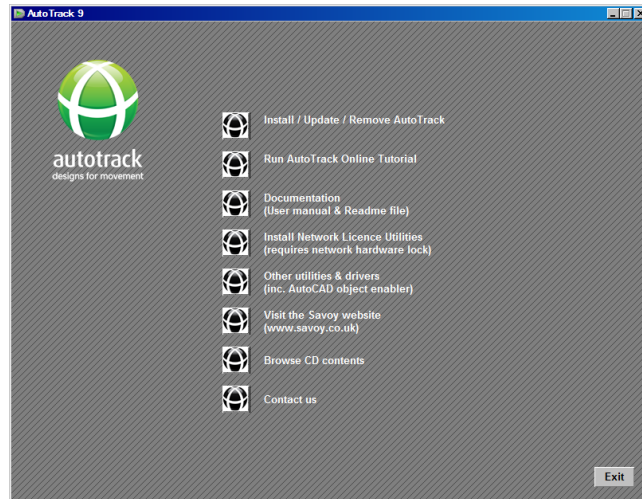
Insert the CD in the drive. The CD should start automatically if autorun is enabled and you can proceed to step 4. If the CD does not start automatically then proceed as follows:-

2. Click the **Start** button and select **Run**. The Run dialog will appear.



Windows XP Run dialogue

3. Type **d:setup** (change the drive letter to suit your CD) and click on **OK**.
4. The CD browser will appear.



CD Browser

5. Click **Install / Update / Remove AutoTrack**.

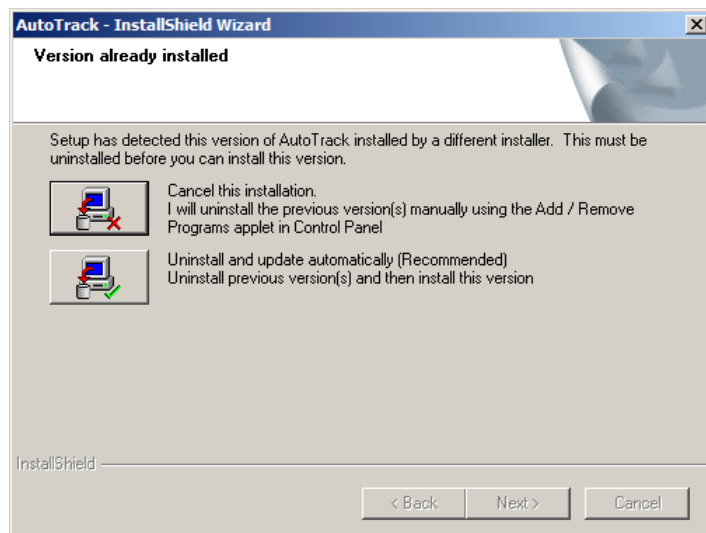
### Warning

*If you have a newer version of AutoTrack installed, or the object enabler version these must be uninstalled manually before you can install standard AutoTrack.*

6. On the Choose Setup Language dialog you can select your preferred installation language. Click **Next**.
7. If you are installing AutoTrack for the first time on a computer the Welcome to the InstallShield Wizard for AutoTrack dialog will appear. Go to the next step.

If instead you see the Welcome to the AutoTrack Setup Maintenance dialog then you already have this version of AutoTrack installed on your computer. Refer to [Modifying, repairing or removing AutoTrack](#).

If you already have a different version of AutoTrack installed then you will see the Version Already Installed dialog.

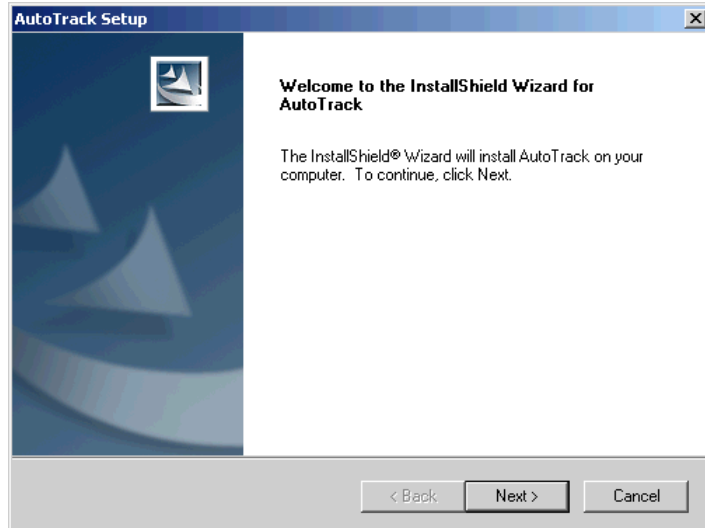


Version Already Installed dialog

Before you can install a new version of AutoTrack any previous version must be uninstalled. You have two options:-

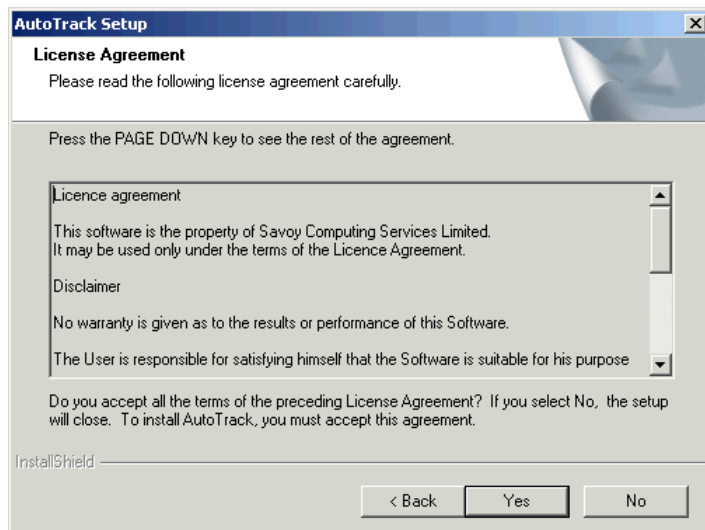
Select **Cancel this installation** if you don't want the previous version removed just yet or if you want to remove the previous version yourself. Setup will close.

Select **Uninstall and Update Automatically** if you want Setup to remove the previous version for you and install the new version. When it has finished uninstalling the previous version you will see the Welcome to the InstallShield Wizard for AutoTrack dialog.



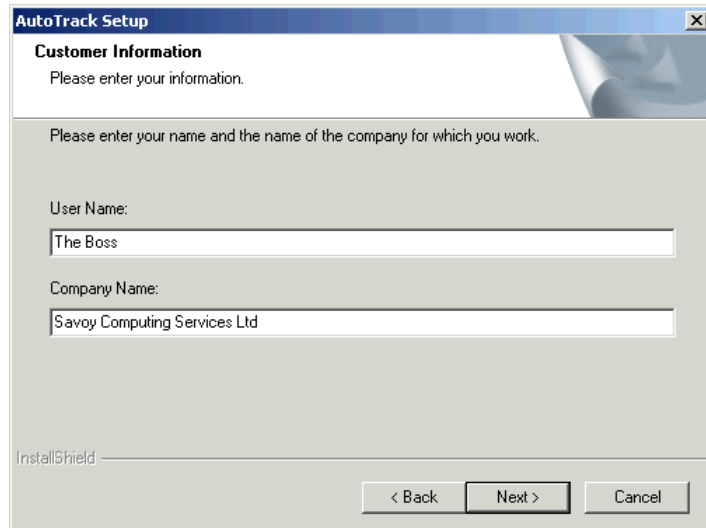
Welcome to the Installshield Wizard for AutoTrack dialog

8. Click **Next** to start the installation process. The Licence Agreement dialog will appear.



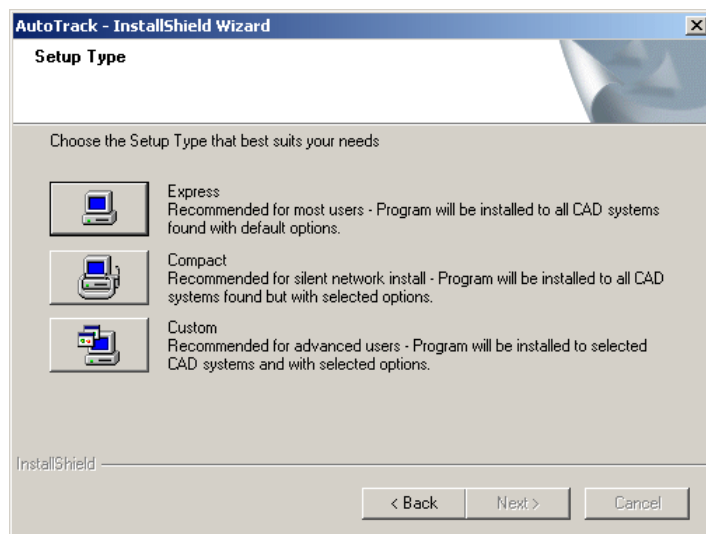
Licence Agreement dialog

9. Click **Yes** if you accept the terms of the licence agreement. The User Information dialog will appear.



User Information dialog

10. Enter your details.
11. Click **Next**. The Setup Type dialog will appear.



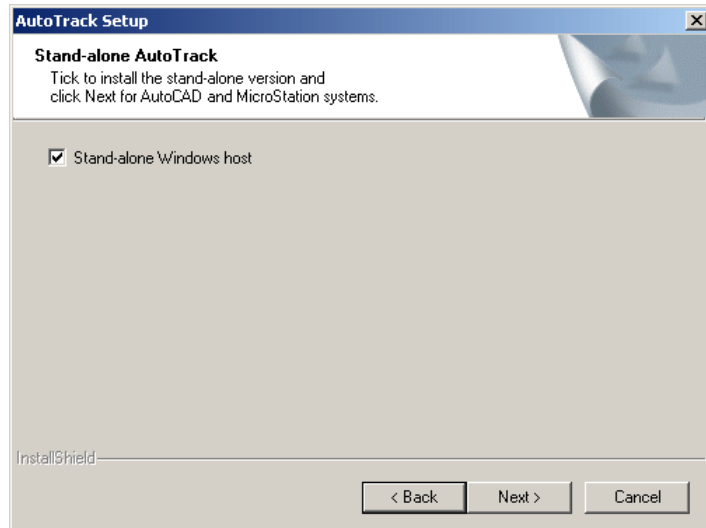
Setup Type dialog

12. Select **Express** to install AutoTrack on all available platforms. On AutoCAD platforms AutoTrack will be installed on the AutoTrack profile (which will be created if necessary). Update checking will be enabled. The XviD compression codec will be installed. Adobe Acrobat Reader will be installed if necessary. Go to step 42.

Select **Compact** if you want to install AutoTrack to all CAD systems found but want to specify the options. This option is ideal for creating silent script installs. Go to step 20.

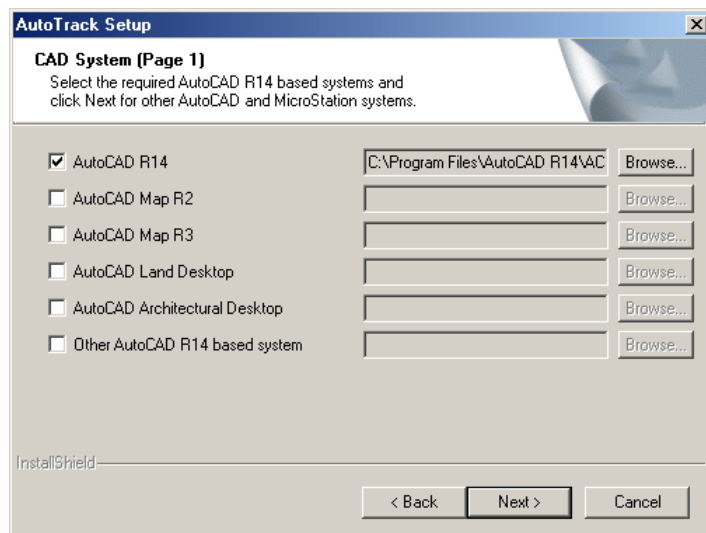
Select **Custom** to choose which platforms you want to install or to exclude certain options. Go to step 13.

13. The Stand-alone AutoTrack dialog will appear.



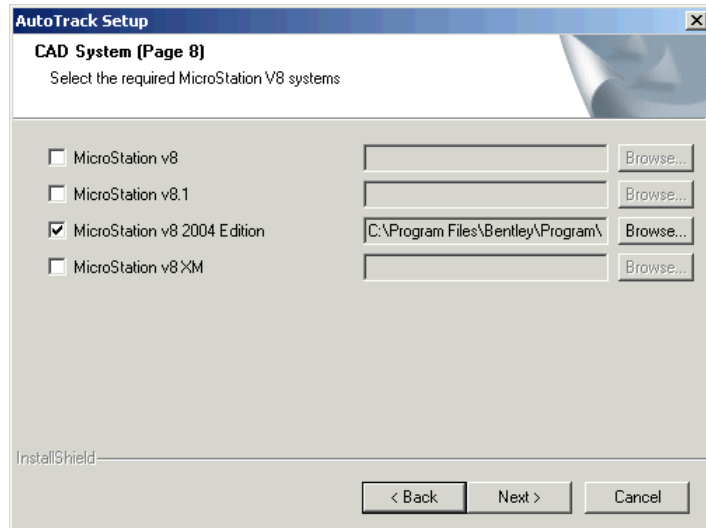
Stand-alone AutoTrack dialog

14. Tick the box if you want the stand-alone Windows host installed.
15. Click **Next**. A series of third party CAD system selection dialogs will appear starting with BricsCAD, followed by AutoCAD 14 based CAD systems.



CAD System dialog (AutoCAD R14)

16. Select the AutoCAD R14 based systems on which you wish to run AutoTrack by ticking the appropriate boxes. Note that all CAD systems that Setup has found on your system will have the CAD program executable file in the edit box and will be selected by default. Setup can only fully install and configure AutoTrack for CAD systems that it can find.
17. If you wish to install support for a system that has no file listed then tick the option and click the appropriate **Browse** button. Now browse to the directory where Setup can find the required file. Any CAD system that you select that does not have a path listed will not be correctly installed.
18. Click **Next**. The AutoCAD 2000/2000i based system selection dialog will appear now followed by pages for AutoCAD 2002 to 2012, MicroStation systems followed by MicroStation derivative systems.



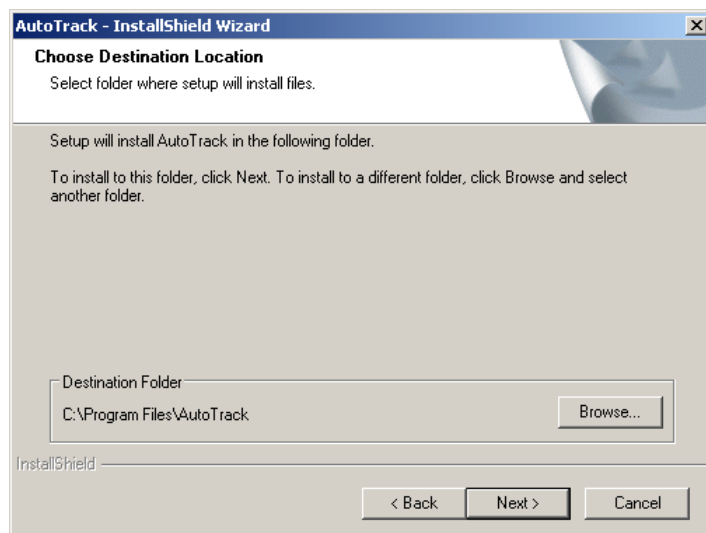
CAD System dialog (MicroStation V8)

19. Select the MicroStation based systems on which you wish to run AutoTrack by ticking the appropriate boxes.

**Note**

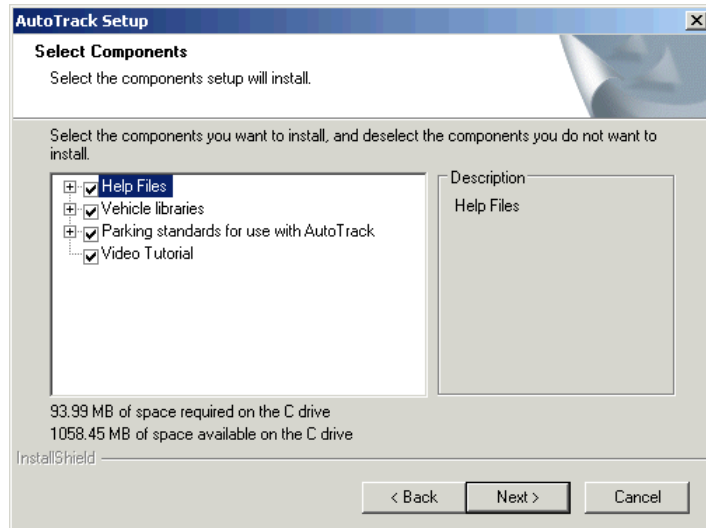
*All versions found on your computer are selected by default.*

20. Click **Next**. The Choose Destination Location dialog will appear.



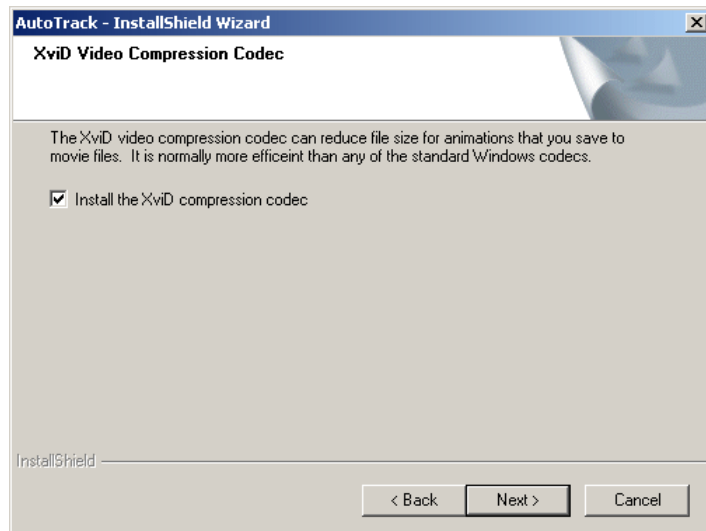
Choose Destination Location dialog

21. If you wish to change the default location then click **Browse** and select your preferred directory.
22. Click **Next**. If you selected the custom installation then the Select Components dialog will appear.



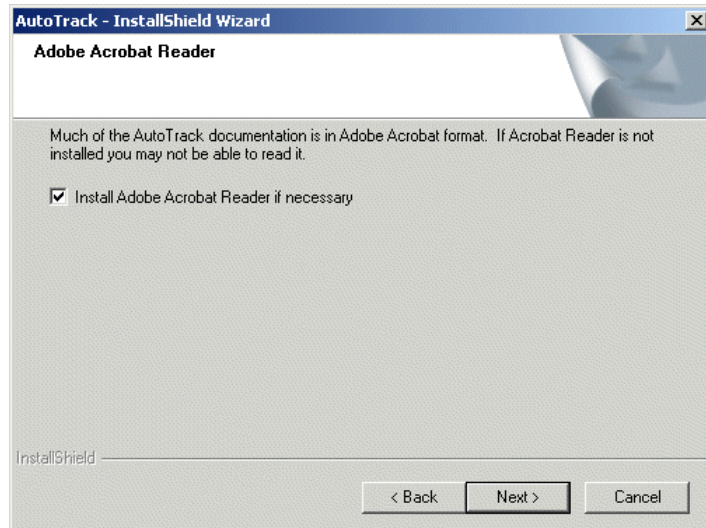
Select Components dialog

23. Select the components that you require by checking the boxes.
24. Click **Next**. The XviD Compression Codec dialog will appear.



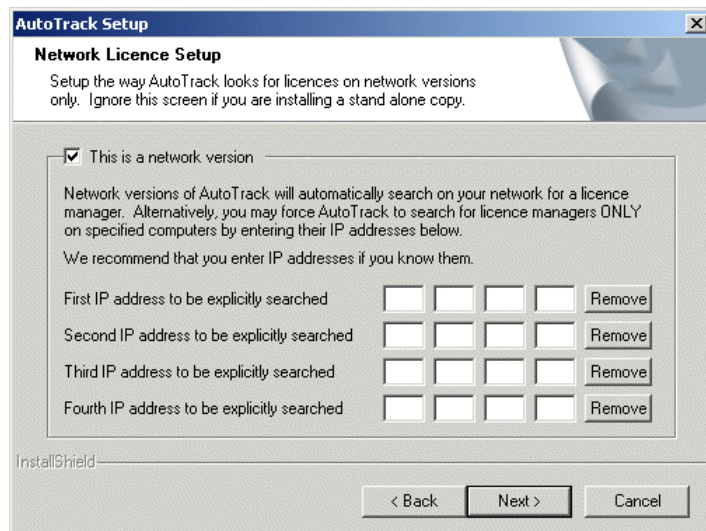
XviD Video Compression Codec dialog

25. If you create an AVI file of an animation you will probably need to use a video compression codec to reduce the file size to a manageable level. Various video compression codecs are installed with Windows as standard but we have found the XviD video compression codec to be better than these in terms of both compression level and quality.
26. Click **Next**. The Adobe Acrobat Reader dialog will appear.



Adobe Acrobat Reader dialog

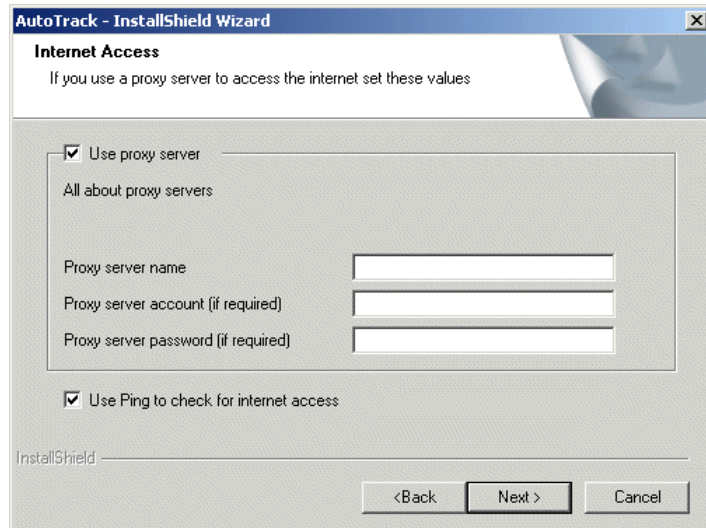
27. More than likely you already have Adobe Acrobat Reader installed on your computer but if you don't then you will not be able to read or print the AutoTrack documentation.
28. Click **Next**. The Network Licence Setup dialog will appear.



Network Licence Setup dialog

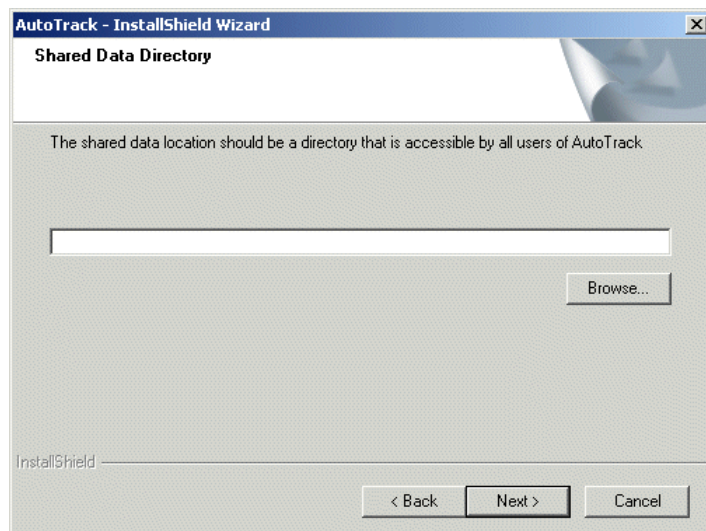
29. Only tick **This is a network version** if you have a network hardware lock. Otherwise untick this option.
30. By default network versions of AutoTrack search for a network licence manager and maintain a search list automatically. We recommend that you use this default functionality. However, you may, if you wish, enter the IP addresses of up to four licence manager servers on this dialog. These addresses can also be maintained from AutoTrack.
31. Click **Next**. The Internet Access dialog will appear.





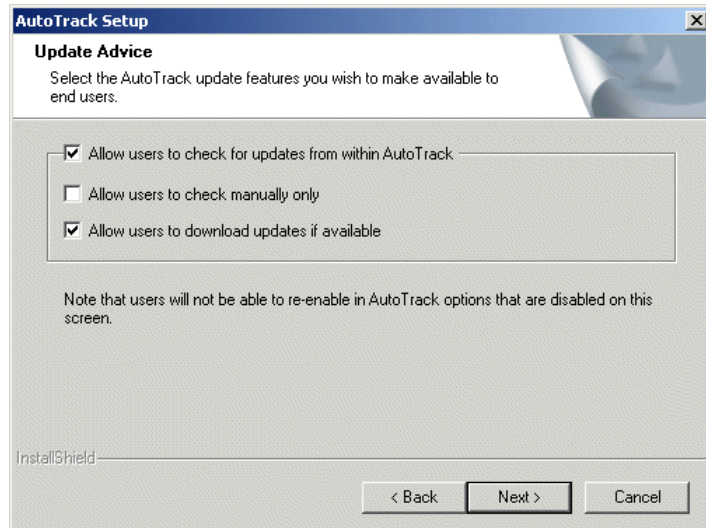
Internet Access dialog

32. If you use a proxy server then you should enter the details here. You may suffix the **Proxy server name** with the port number if required, e.g. `www.savoy.co.uk:8080`.
33. Click **Next**. The Shared Data Directory dialog will appear.



Shared Data Directory dialog

34. Enter the full path of the directory you wish to use to share data within your company or department.
35. Click **Next**. The Update Advice dialog will appear.



Update Advice dialog

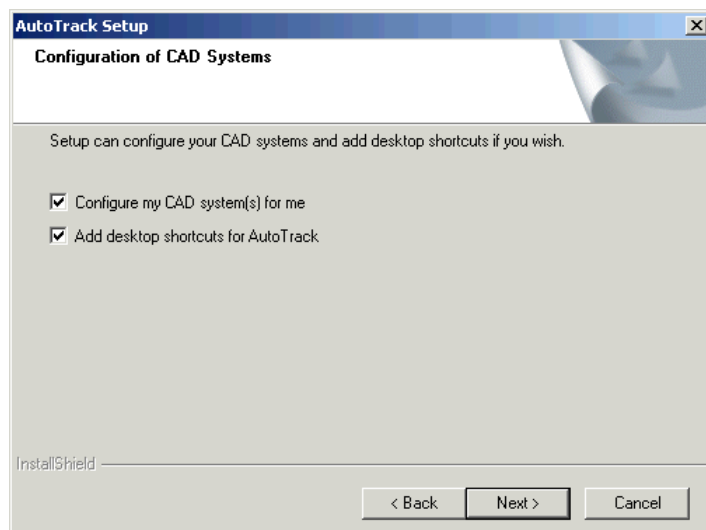
36. By default end users have options to check for more recent versions of AutoTrack either automatically (at a specified time interval) or manually.

If you wish to prevent users from checking for updates entirely then untick **Allow users to check for updates from within AutoTrack**.

If you wish to only allow them to perform manual checks then tick **Allow users to check manually only**.

Finally, to allow them to check for updates but prevent them from downloading the file untick **Allow users to download updates if available**.

37. Click **Next**. The Configuration of CAD systems dialog will appear.

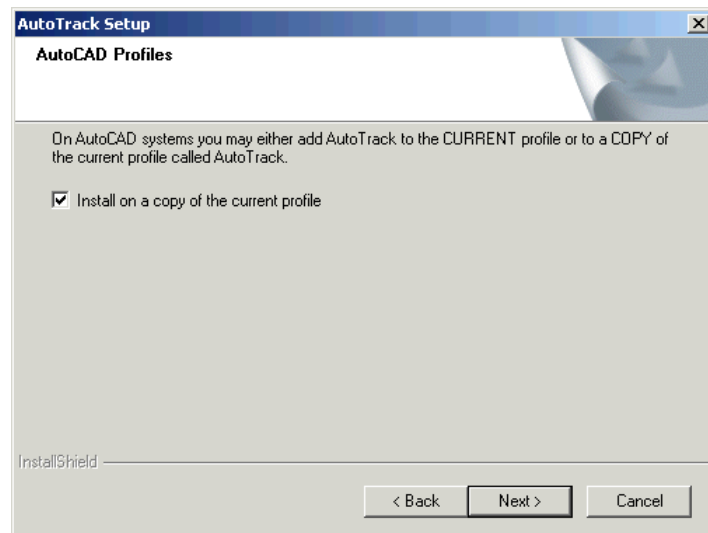


Configuration of CAD systems dialog

38. You may either allow Setup to configure your CAD systems now or leave it until the first time the software is run. We recommend that you allow Setup to configure your CAD system so that when subsequently uninstall the software all settings and registry changes are reinstated. If you tick **Add an AutoTrack desktop**

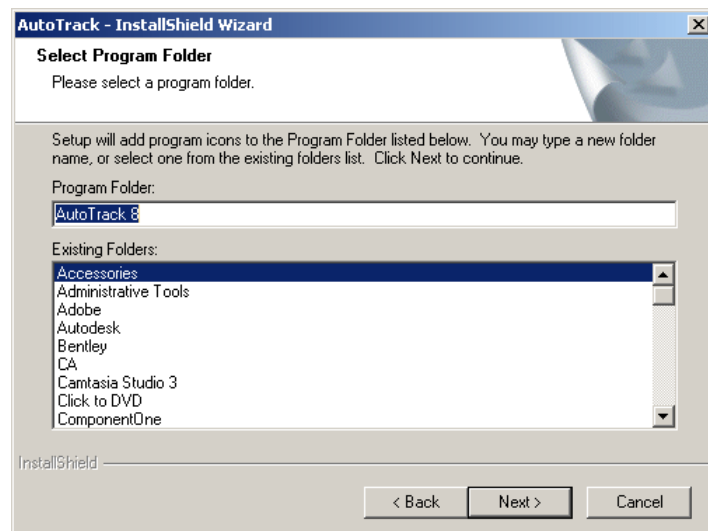
**shortcut** Setup will add a shortcut icon for each platform that you have selected. Tick the options you require.

39. Click **Next**. If you have allowed Setup to configure your CAD systems then the AutoCAD Profiles dialog will appear.



AutoCAD Profiles dialog

40. On AutoCAD you can opt to install AutoTrack onto a copy of the current profile called AutoTrack or directly onto the current profile. By default it is installed on a copy of the current profile. Untick **Install on a copy of the current profile** if you want to add AutoTrack to the current profile. If a profile called AutoTrack already exists, AutoTrack will be added to it. If you opted to manually configure your system then AutoTrack will be installed onto the current AutoCAD profile each time it is run if necessary.
41. Click **Next**. The Select Program Folder dialog will appear.



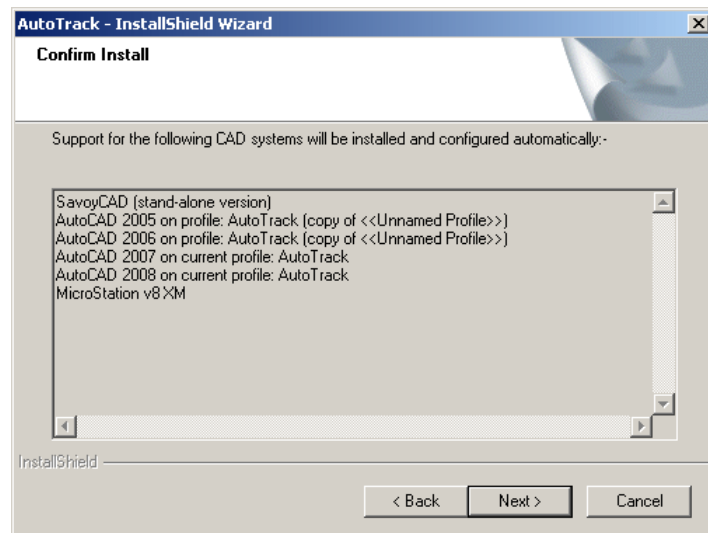
Select Program Folder dialog

42. By default Setup will install AutoTrack to the AutoTrack folder. Select an existing alternative or enter a new folder name if you wish.

**Note**

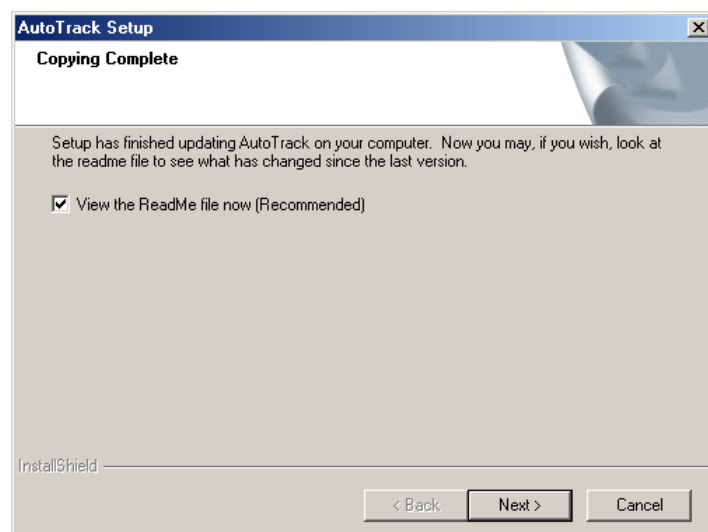
*You will not see this dialog if you are modifying an installation.*

43. Click **Next**. The Confirm Edits dialog will appear.



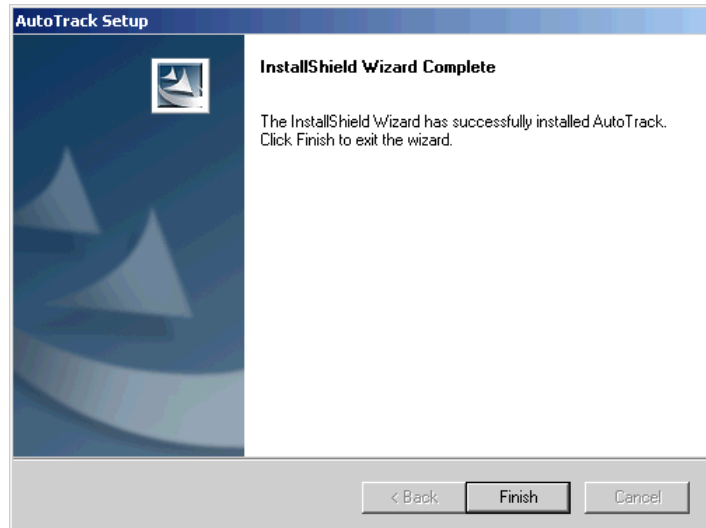
Confirm Edits dialog

44. Double check that you are installing the correct versions (and on the correct AutoCAD profiles) and click **Next**. The installation process will now start.
45. Once AutoTrack has been installed the XviD codec will be installed if required followed by Acrobat Reader if required. In both cases, follow the prompts and accept the default values.
46. Next the hardware lock driver will be installed. During driver installation the hardware lock must be removed. The hardware lock installer is designed to run with no user interaction and should not be interrupted. You will be prompted to reinsert the hardware lock as soon as it is safe to do so.
47. When file copying is finished the Copying Complete dialog will appear.



Copying Complete dialog

48. The readme file lists new features and bugs fixed in the new version.
49. Click **Next**. The Setup Complete dialog will appear.



Setup Complete dialog

50. If it is necessary to restart your computer then you will be given the option to restart it now or later. Select your preference and click **Finish**.
51. If you chose to have Setup configure your CAD system for you then you should now be able to see AutoTrack on the top menu bar in AutoCAD or under the Applications menu on MicroStation.
52. If you chose not to allow Setup to configure your CAD system for you then refer to the section entitled [Configuring AutoCAD manually](#) or [Configuring MicroStation, Bentley PowerDraft, PowerCivil, Power InRoads, Power GEOPAK or MX manually](#) as appropriate.

#### Note

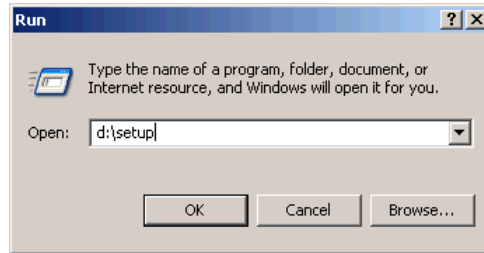
*AutoTrack cannot be configured to run automatically from a shortcut on Bentley MX. Users on this platform must load the product manually.*

## Modifying, repairing or removing AutoTrack

### Tip

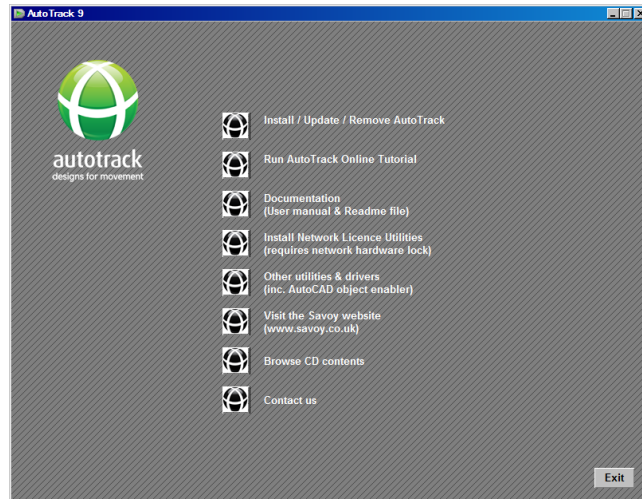
*We strongly recommend that you configure your copy of AutoTrack via the AutoTrack entry in the **Programs and Features** applet (or, on older copies of Windows, the **Add/Remove Programs** applet) in Control Panel. Alternatively, proceed as follows:-*

1. **If you have downloaded a self-extracting installer copy of AutoTrack**  
You will have a file with a .exe extension. The full name is version specific but the file for v10.00 is called atr1000.exe. If you cannot see the file extension and have two files that appear to have the same name look for the one whose type is **Application**. Double click on the file to start the install and go to step 6.  
  
**If you have an AutoTrack CD**  
Insert the CD in the drive. The CD should start automatically if autorun is enabled and you can proceed to step 4. If the CD does not start automatically then proceed as follows:-
2. Click the **Start** button and select **Run**. The Run dialog will appear.



Windows XP Run dialogue

3. Type **d:setup** (change the drive letter to suit your CD) and click on **OK**.
4. The CD browser will appear.



CD Browser

5. Click **Install / Update / Remove AutoTrack**.

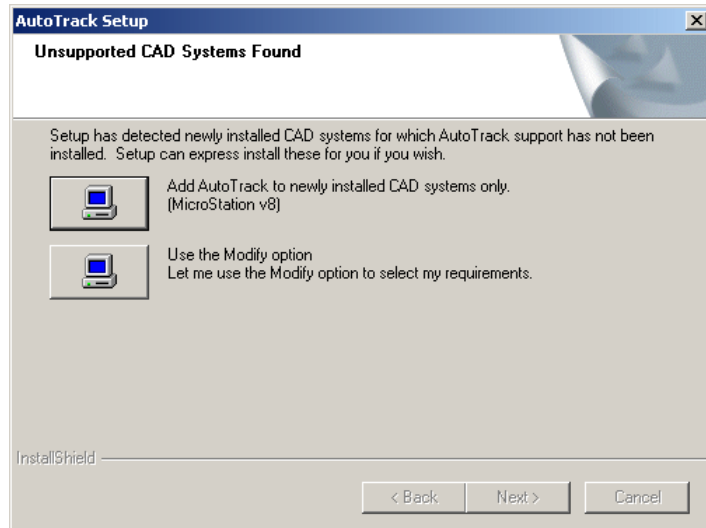
#### Note

*If you have other applications running you may get a warning to close these applications so that shared files may be updated.*

6. If you see the Welcome to AutoTrack Setup dialog then you do not have a copy of AutoTrack installed on your computer. Refer to [Installing AutoTrack](#).

If you see the Earlier Version Found dialog then you are installing a new version.

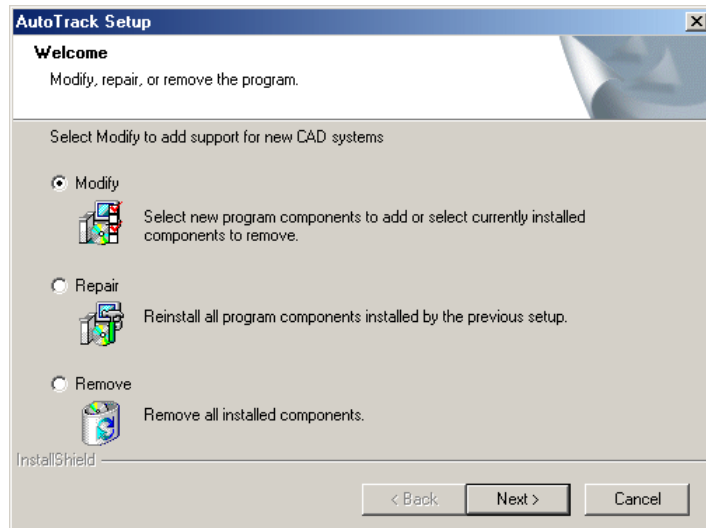
If you have installed new CAD systems since you installed AutoTrack, or if you did not originally install AutoTrack on all CAD systems on your computer, the Unsupported CAD Systems Found dialog will appear.



Unsupported CAD Systems Found Dialog

7. Depending upon your particular circumstances you may **Add AutoTrack to newly installed CAD systems only** or **Add AutoTrack to all unsupported CAD systems**. Setup will update your system and close when it has finished. You may also opt to **Use the Modify option** (see below).

If none of these apply, or if you opted to use the Modify option, the Welcome to the AutoTrack Setup Maintenance dialog will appear.



Welcome to the AutoTrack Setup Maintenance dialog

8. If you wish to add or remove support for a CAD system or to add or remove other program files (e.g. the on-line manual) select **Modify**. Refer to step 13 onwards in [Installing AutoTrack](#).

If you have reason to believe that a file is missing or has become corrupted then select **Repair**. This will reinstall all the files installed by the previous setup to the same location.

If you wish to remove AutoTrack from your computer select **Remove**. You will be asked to confirm and then AutoTrack will be removed and Setup will close.

---

## Some points to note

### ***Windows NT based systems (NT4, 2000, XP, 2003, Vista, Windows 7, etc.)***

#### **Default location of application data files**

By default the AutoTrack settings files, menus and other data files are stored in folders in the common application data directory. This is usually located as follows:-

On Windows XP or earlier it is `C:\Documents and Settings\All Users\Application Data\AutoTrack`,

On Windows Vista or later it is `C:\Program Data\AutoTrack`.

#### **Storing application data files elsewhere**

Where ever you choose to store your AutoTrack data files all users must be granted FULL access rights to this location.

If you wish to store the AutoTrack application data files in another location then create a file in the AutoTrack installation directory called `SAVOY.INI` containing the following lines:-

```
[SETTINGS]
```

```
ApplicationDataDir={Application Data Directory}
```

Where the text in brackets (and the brackets themselves) should be replaced with the full path (or the path relative to the program installation directory) of the preferred data file location. For example:-

```
[SETTINGS]
```

```
ApplicationDataDir=D:\Example\AutoTrackAppData
```

You should then grant all AutoTrack users FULL access rights to this location.

#### **Storing application data with the program**

If you would rather your settings, menus and other application data files were stored with the program then we recommend that you do not specify the installation directory itself but create a subdirectory. Create a file in the AutoTrack installation directory called `SAVOY.INI` containing the following lines (we recommend `AppData` as a directory name but anything will do):-

```
[SETTINGS]
```

```
ApplicationDataDir=.\AppData
```

Then create `AppData` (or whatever you have called it) as a subdirectory of the program installation directory and grant all users FULL access rights. So, if you installed AutoTrack to the default location you need to create a directory called `C:\Program Files\AutoTrack\AppData`.

#### **Access rights**

AutoTrack must be installed by someone with Administrator rights. Depending upon your security policy, before you can run the software as an end user you may need to make changes to the user profiles. Login as a normal user and if AutoTrack is on the menu and runs you do not need to make the following changes. If AutoTrack is not on the menu and/or does not run then make the following changes as appropriate:-



Grant all AutoTrack users FULL access rights to the common application data directory. This is usually located as follows:-

On Windows XP or earlier, in the C:\Documents and Settings\All Users\Application Data\AutoTrack subdirectory

On Windows Vista or later, in the C:\Program Data\AutoTrack directory.

If you have specified an alternative application data directory in the SAVOY.INI file then grant all AutoTrack users FULL access rights to this directory.

Copy the AutoTrack menu from the Administrator's Start Programs menu to each AutoTrack user's menu.

If you are using Roaming Profiles consult your IT Department for advice.

---

## AutoCAD object enabler

In the AutoCAD version of AutoTrack the path entity is a custom object that is calculated and drawn by AutoTrack. Systems must therefore have AutoTrack installed in order to update and maintain these objects. Proxy graphics allow non-AutoTrack users to see the data (see [Viewing AutoTrack paths in AutoCAD if you don't have AutoTrack](#)) but the functionality is very limited, e.g. you cannot snap to an AutoTrack path.

The object enabler is designed to give non-AutoTrack users limited functionality over AutoTrack data, allowing them, for example, to move reports or snap to a path to measure a distance. It also allows selection and playback of animations contained within a drawing.

The AutoTrack object enabler is free to download and is also available on the AutoTrack CD. It may be freely emailed to non-AutoTrack recipients of AutoTrack drawings. It cannot be installed with standard AutoTrack (there would be little point anyway).

This issue does not arise in the MicroStation or stand-alone versions that use different techniques.

### Important

*Use of the object enabler does not in any way diminish our recommendation that you save proxy graphics with your drawing. Furthermore, you should note that if you make a change using the object enabler proxy graphics will only be resaved if you have the appropriate system variables set (see [Viewing AutoTrack paths in AutoCAD if you don't have AutoTrack](#)).*

## To install the object enabler version from CD

1. First make sure that you do not have AutoTrack, either a demo or a full copy, installed.
2. Then insert the AutoTrack CD and when the CD menu appears, select **Other Utilities**. The installer will start.
3. Select **Install Object Enabler version**. Select **Express** to install the object enabler on all versions of AutoCAD found.

## To install the software from the web

1. Download the object enabler version. It will have a filename of the form **ATRxxxO.EXE**, where **xxx** is the filename, e.g. **ATR920O.EXE**.
2. To install the software click the **Start** button on the Windows taskbar and select **Run**.
3. Browse to the file you have downloaded and click **Open** followed by **Run**. The installer will start.
4. Select **Install Object Enabler version**. Select **Express** to install the object enabler on all versions of AutoCAD found.

---

## Scripted 'silent' installations using the self-extracting installer

AutoTrack Setup is fully ZENworks compatible allowing the full version (i.e. not the demo version) to be installed centrally and distributed on demand over a network with no user prompts.

The following instructions assume that you plan to install the software onto one or more client computers from a central source (file server).

Apart from obvious criteria such as adequate disk space, a successful silent installation requires that:-

- the install source files are mapped to the same location for all client PC's, and
- you either specify a Compact install or that all client computers have the selected CAD system(s) installed in the same location and run at least once.

Adobe Acrobat Reader and the XviD compression codec are third party applications and their installers require some user interaction. If you would rather users did not have to interact with the install process you should select Custom install and deselect these two options. Both items are installed if you perform an Express install.

### Creating the install script

You must create the installation script on a client computer that is set up exactly as the other computers on which it will be installed silently.

1. Either copy the **ATRACK** directory from the AutoTrack CD to a suitable location on your file server's hard disk, or download the compressed file (e.g. `atr920.exe`) from the Savoy website to a suitable location on your file server's hard disk, such as a directory called **ATRACK**.
2. Now go to one of the client computers. To create the silent install script you need to run either `setup.exe` from the **ATRACK** directory on the server hard disk or the downloaded file (e.g. `atr920.exe`) with a `-r` switch. The easiest way to do this is to create a shortcut on the desktop.
3. Browse to the **ATRACK** directory, right click on the file **setup.exe** or the downloaded file (e.g. `atr920.exe`) and select **Create Shortcut**.
4. Move the shortcut to the desktop.
5. Right click on the new desktop shortcut, select **Properties** and add `-r` to the end of the **Target** field. The Target field should now read something like:-

```
f:\{source location}\atrack\setup.exe -r
```

or

```
f:\{source location}\atrack\atr920.exe -r
```

6. Click **OK** to close the properties dialog.

7. Double click on this shortcut to start the AutoTrack installation and follow the prompts to install AutoTrack in the normal way.
8. Your selections and values will be stored in a file called **setup.iss** in the Windows directory. We recommend that you do not tick the options on the Finish dialog to view the readme file and to run the hardware lock wizard.

#### Note

*If you intend to deploy AutoTrack while users are not logged in then perform a Custom install and deselect the option **Configure my CAD systems for me**.*

## Running a silent install

1. Working from a client computer, move the file setup.iss from the Windows directory back to the **ATRACK** directory on the server's hard disk.
2. Now use windows explorer to browse to the file `setup.exe` or `atr920.exe` in the **ATRACK** directory on the server.
3. Right click on the file and select **Create Shortcut**.
4. Move the shortcut to a suitable location accessible by all potential users (probably in a public area on the server).
5. Right click on the new desktop shortcut, select Properties and add the `-s` switch to the Target field. The Target field should now read something like:-

```
f:\{source location}\atrack\setup.exe -s
```

or

```
f:\{source location}\atrack\atr920.exe -s
```

6. Click **OK** to close the properties dialog.
7. Double click on the desktop shortcut to start the silent install.
8. If you want to store the setup.iss file in another location use the additional switch `-f1` to show Setup where to find it. For example (no space between the `f1` and the path):-

```
-f1{iss file path}\setup.iss
```

You may wish to create different iss files for installing, removing and maintaining AutoTrack each named appropriately (e.g. **install.iss**, **remove.iss** or **maintain.iss**) and referenced as described above. Note however that the silent setup operation will fail if you run it out of sequence, e.g. if you try to remove a copy of AutoTrack that has not been installed it will fail. The error log file (setup.log) is created in the same directory as the iss file. If the last entry in the file, under the heading **[ResponseResult]**, is **ResultCode = 0** then the operation was successful; otherwise, it failed.

Note that even a silent install will fail with an error if certain criteria are not met. These include the following:-

- inadequate disk space,
- previous version installed,
- no CAD system selected,

- CAD system still running,
- the CAD system not having been run,
- not running with administrator rights,
- not having the required level of service pack,
- both AutoCAD 2000 and AutoCAD 2002 installed (not allowed by Autodesk),
- failure to perform an automatic edit,
- failure to create the program folder, or
- failure to migrate settings.

## Adding files to an installation

Setup can run a batch file or other executable after it has finished installing AutoTrack if you supply the name of the file you wish to execute as a command line switch in the following format:-

```
f:\{source location}\atrack\setup.exe -s -batch={batch filename}
```

For example:-

```
c:\atrack\setup.exe -s -batch=c:\atrack\setup.bat
```

### Note

*You can use the `-batch` switch with the `-f1` switch.*

## Uninstalling AutoTrack

You can uninstall AutoTrack without going to Control Panel run Setup with a `-uninst` switch:-

```
f:\{source location}\atrack\setup.exe -uninst
```

However, this switch will still display a confirmation prompt.

To uninstall AutoTrack silently you will need to create an uninstall script. To do this go to a client computer that has AutoTrack installed and follow the steps in [Creating the install script](#) to create an uninstall script.

## Updating AutoTrack

To perform a silent update of AutoTrack, we recommend that you run two scripts, one to uninstall the old version and a second to install the new version. This will require two `.iss` files referenced using the `-f1` switch. For example you might run:-

```
c:\atrack\setup.exe -s -f1c:\atrack\remove.iss
```

Followed by:-

```
c:\atrack\setup.exe -s -f1c:\atrack\install.iss
```

These two commands could be run from a single batch file. However, if you do this you should use the `-sms` switch to ensure that the first instance of setup has finished before the second one starts. Hence your batch file would look something like this:-

```
c:\atrack\setup.exe -s -sms -f1c:\atrack\remove.iss
c:\atrack\setup.exe -s -sms -f1c:\atrack\install.iss
```

---

## Configuring AutoCAD manually

### Note

*Registry changes made by either of the following 'manual' methods will not be removed when you uninstall the product and hence we recommend that you allow Setup to configure your AutoCAD system for you.*

If you chose not to allow Setup to configure your copy of AutoCAD then proceed as follows...

1. Run AutoTrack from the Start Programs menu which will load AutoCAD and AutoTrack. This will configure your system and you should then be able to see AutoTrack on your AutoCAD menu bar. Henceforth, however you run AutoCAD, AutoTrack should appear on the menu bar.

Alternatively for all versions of AutoCAD and all derivatives except Civil 3D 2010 and later...

1. Run AutoCAD as you normally do.
2. Type `APpload` at the command line.
3. If necessary change the **Files of type** box to include `*.ARX`.
4. Click the **File** button and browse to the AutoTrack directory (Normally `C:\PROGRAM FILES\AUTOTRACK`).
5. Highlight the program file appropriate to your CAD system as follows:-

For **AutoCAD R14**, Map R2, Map R3, Architectural Desktop, Land Development Desktop and other derivative products load the file `ATRA140.ARX`.

For **AutoCAD 2000**, 2000i, Map 2000, Map 2000i, Architectural Desktop 2i, Land Development Desktop 2i and other derivative products load the file `ATRA150.ARX`.

For **AutoCAD 2002**, Map 5, Map 6, Architectural Desktop 3, Architectural Desktop 3.3, Land Desktop 3 and other derivative products load the file `ATRA1506.ARX`.

For **AutoCAD 2004**, Map 2004, Architectural Desktop 2004, Land Desktop 2004 and other derivative products load the file `ATRA160.ARX`.

For **AutoCAD 2005**, Map 2005, Architectural Desktop 2005, Land Desktop 2005 and other derivative products load the file `ATRA161.ARX`.

For **AutoCAD 2006**, Map 2006, Architectural Desktop 2006, Land Desktop 2006, Civil 3D 2006 and other derivative products load the file `ATRA162.ARX`.

For **AutoCAD 2007**, Map 2007, Architectural Desktop 2007, Land Desktop 2007, Civil 3D 2007 and other derivative products load the file `ATRA170.ARX`.

For **AutoCAD 2008**, Map 2008, Architecture 2008, Land Desktop 2008, Civil 3D 2008 and other derivative products load the file

ATRA171.ARX.

For **AutoCAD 2009**, Map 2009, Architecture 2009, Land Desktop 2009, Civil 3D 2009 and other derivative products load the file ATRA172.ARX.

For **64-bit versions of AutoCAD 2009 based products**, load the file ATRA17264.ARX.

For **AutoCAD 2010**, Map 2010, Architecture 2010, Land Desktop 2010 and other derivative products except Civil 3D 2010 load the file ATRA180\_ARX.ARX.

For **64-bit versions of AutoCAD 2010 based products except Civil 3D**, load the file ATRA18064\_ARX.ARX.

For **AutoCAD 2011**, Map 2011, Architecture 2011, Land Desktop 2011 and other derivative products except Civil 3D 2011 load the file ATRA181\_ARX.ARX.

For **64-bit versions of AutoCAD 2011 based products except Civil 3D**, load the file ATRA18164\_ARX.ARX.

For **AutoCAD 2012**, Map 2012, Architecture 2012 and other derivative products except Civil 3D 2012 load the file ATRA182\_ARX.ARX.

For **64-bit versions of AutoCAD 2012 based products except Civil 3D**, load the file ATRA18264\_ARX.ARX. Click **Open**.

For **AutoCAD 2013**, Map 2013, Architecture 2013 and other derivative products except Civil 3D 2013 load the file ATRA190\_ARX.ARX.

For **64-bit versions of AutoCAD 2013 based products except Civil 3D**, load the file ATRA19064\_ARX.ARX.

6. Click **Open**.
7. Back in the Load/Unload Applications dialog click the **Load** button and then close the Load/Unload Applications dialog.
8. If you use profiles then make the required profile current.
9. Type **AUTOTRACK** on the command line. AutoTrack will be loaded and your CAD system will be configured for use.
10. Repeat steps 7 and 8 for other profiles as required.

For AutoCAD Civil 3D 2010 and later...

1. Run AutoCAD as you normally do.
2. Type **NETLOAD** at the command line.
3. If necessary change the **Files of type** box to include \*.DLL.
4. Click the **File** button and browse to the AutoTrack directory (Normally C:\PROGRAM FILES\AUTOTRACK).
5. Highlight the program file appropriate to your CAD system as follows:-

For **AutoCAD Civil 3D 2010** load the file ATRC180\_ARX.DLL.

For **AutoCAD Civil 3D 2011** load the file ATRC181\_ARX.DLL.

For 64-bit **AutoCAD Civil 3D 2011** load the file ATRC18164\_ARX.DLL.

For **AutoCAD Civil 3D 2012** load the file ATRC182\_ARX.DLL.

For 64-bit **AutoCAD Civil 3D 2012** load the file

ATRC18264\_ARX.DLL.

For **AutoCAD Civil 3D 2013** load the file ATRC190\_ARX.DLL.  
For 64-bit **AutoCAD Civil 3D 2013** load the file  
ATRC19064\_ARX.DLL.

6. Click the **Open** button.
7. If you use profiles then make the required profile current.
8. Type `AUTOTRACK` on the command line. AutoTrack will be loaded and your CAD system will be configured for use.
9. Repeat steps 7 and 8 for other profiles as required.
- 1.



---

# Configuring MicroStation, Bentley PowerDraft, PowerCivil, Power InRoads, Power GEOPAK or MX manually

Setup configures all Bentley CAD variants except MX (or MXROAD) to run AutoTrack when run from the AutoTrack for [Bentley product] desktop shortcut or menu item. AutoTrack can (and must for Bentley MX) also be loaded manually via the MDL Applications dialog. However, Setup no longer creates a new workspace and no longer adds AutoTrack to the list of Available Applications in other workspaces. If you want to do this then proceed as follows...

1. Run your Bentley CAD system as you normally would.
2. Select the User or Workspace you want to configure.
3. Create or open a file.
4. If you are running Bentley MX, the **Workspace** menu may not be visible. Select **CAD Menu** from the File menu.
5. Select **Configuration** from the **Workspace** menu.
6. Select the category **Primary Search Paths**.
7. **To make AutoTrack run in this workspace...**  
Click on **MDL Applications** from the edit box at the top right and then click the **Select** button. Browse to the `LOADERV8` subdirectory of the AutoTrack installation directory and click **Add** to add it to the list. For example, if you installed AutoTrack to the default directory you should browse to `C:\PROGRAM FILES\AUTOTRACK\LOADERV8\ (LOADER\` on versions prior to V8) and click **Add**.

## Important

*If you enter the path manually using the **Edit** button, then note the backslash at the end of the path. This is critical.*

8. Click **Done** to close the box. This will ensure that AutoTrack will run in MicroStation but it will not be listed in **Available Applications**.
9. **To make AutoTrack available in this workspace...**  
Click on **Visible MDL Applications** from the edit box at the top right and click the **Select** button. Browse to the `LOADERV8` subdirectory of the AutoTrack installation directory (`LOADER\` on versions prior to V8) and click **Add** to add it to the list. For example, if you installed AutoTrack to the default directory on MicroStation V8 you should browse to `C:\PROGRAM FILES\AUTOTRACK\LOADERV8\` and click **Add**.

## Important

*If you enter the path manually using the **Edit** button, then note the backslash at the end of the path. This is critical.*

10. Click **Done** to close the box. This will make AutoTrack visible to you while running MicroStation but will not load it automatically.
11. Click **OK** to close the Configuration dialog and allow the system to recognise the new search directories.

12. Now reopen the Configuration dialog by selecting **Configuration** from the **Workspace** menu.
13. Select the category **Design Applications**.
14. **To make AutoTrack autoload in this workspace...**  
Look for ATRACK in the list of **Available Applications**. Highlight the entry and click the **Add** button to add it to the list of **Applications to Load**. This will make AutoTrack load automatically when you start MicroStation with this workspace.
15. Click **OK** to close the Configuration dialog.
16. Restart MicroStation with this user and **AutoTrack** should be on the **Applications** menu and the toolbar should be visible.
17. Repeat the above to configure other workspaces as required.
18. Select **MX Menu** from the MX drop down menu to redisplay the MX menus if necessary.

---

## Configuring BricsCAD manually

### Note

*Registry changes made by either of the following 'manual' methods will not be removed when you uninstall the product and hence we recommend that you allow Setup to configure your Bricscad system for you.*

If you chose not to allow Setup to configure your copy of BricsCAD then proceed as follows...

1. Run AutoTrack from the Start Programs menu which will load BricsCAD and AutoTrack. This will configure your system and you should then be able to see AutoTrack on your BricsCAD menu bar. Henceforth, however you run BricsCAD, AutoTrack should appear on the menu bar.

Alternatively for all versions of BricsCAD...

1. Run BricsCAD as you normally do.
2. Type `APpload` at the command line.
3. If necessary change the **Files of type** box to include `*.BRX`.
4. Click the **File** button and browse to the AutoTrack directory (Normally `C:\PROGRAM FILES\AUTOTRACK`).
5. Highlight the program file appropriate to your CAD system as follows:-

For **BricsCAD v11.1**, load the file `ATRB1101.BRX`.  
For **BricsCAD v11.2**, load the file `ATRB1102.BRX`.  
For **BricsCAD v11.3**, load the file `ATRB1103.BRX`.  
For **BricsCAD v11.4**, load the file `ATRB1104.BRX`.  
For **BricsCAD v12.1**, load the file `ATRB1201.BRX`.  
For **BricsCAD v12.2**, load the file `ATRB1202.BRX`.

6. Back in the Load Application Files dialog click the **Load** button and then close the Load Application Files dialog.
7. Type `AUTOTRACK` on the command line. AutoTrack will be loaded and your CAD system will be configured for use.

---

## Resolving hardware lock problems

The **Hardware Lock Wizard** starts automatically to attempt to resolve hardware lock problems detected whilst running AutoTrack. The wizard should be self-explanatory but in the unlikely event that it is unable to solve the problem please contact Savoy Computing Services for assistance.

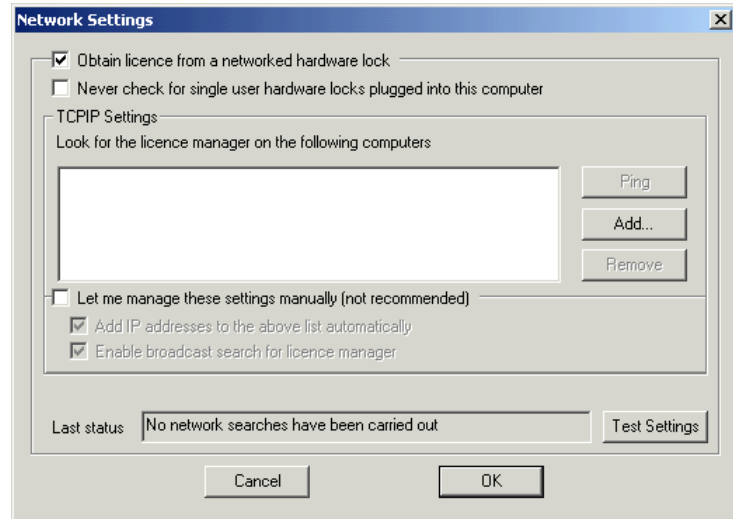
The **Hardware Lock Manager** may be run independently of AutoTrack from the Start, Programs, AutoTrack program folder. This may be necessary if you are installing an update or if you just wish to check the status of your hardware locks.

### Running the Licence Manager on the same computer as AutoTrack

AutoTrack can now safely be run on the same computer as the Licence Manager. However, you might need to add the "loopback" IP address to the list of IP addresses to search. This is because machines listening out for broadcast messages sometimes do not respond if the request is local.

#### *To add the "loopback" address*

1. Select **Hardware Lock Manager** from the Start, Programs, AutoTrack menu. The Hardware Lock Manager will appear.
2. Click the **Configure Network Settings** button. The Network Settings screen will appear.



Network Settings dialog

3. Click **Configure Network Settings** and add 127.0.0.1 to the list of searched IP addresses.
4. Click the **Test Settings** button to check that all is well. If not then refer to [Identifying and resolving problems](#).

## Running the Licence Manager on a remote computer

AutoTrack may report one of two errors when it runs:-

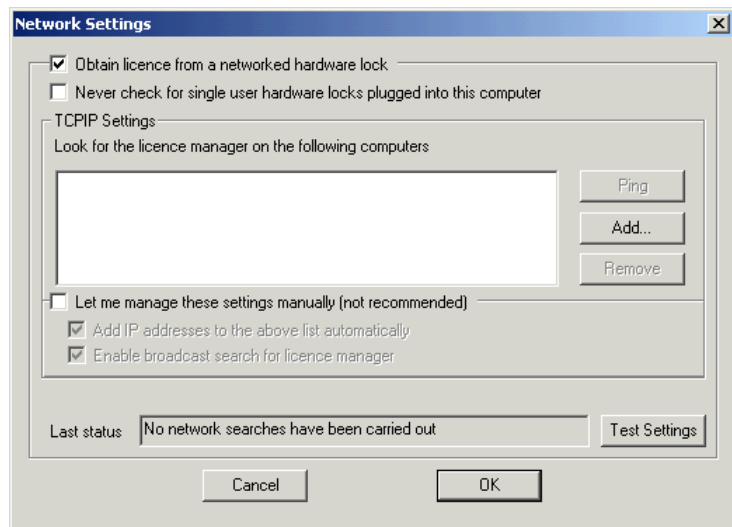
1. No Free Licences Found.
2. No Licence Manager Found.

Message 1 means that there is not a problem, the licence manager has been found BUT there are no available licences, try again later.

Message 2 means that there is a problem. Refer to the next section, [Identifying and resolving problems](#) to fix it.

## Identifying and resolving problems

1. Select **Hardware Lock Manager** from the Start, Programs, AutoTrack menu. The Hardware Lock Manager will appear.
2. Click the **Configure Network Settings** button. The Network Settings screen will appear.



Network Settings dialog

3. The **Last Status** field should indicate the problem. Likely values include:-

### 15 - No Active NetHASP licence Manager was found

This message means that the licence manager could not be found. To fix this, click the **Add** button and add the IP address of the licence manager computer. This should only be needed if the licence manager is running on a different subnet to the application, i.e. a WAN copy. Having added the IP address, click the **Test Settings** button to check that it now works.

If after adding the IP address, the computer is still unable to find the licence manager, then you may have a firewall preventing the system from working. To verify this we suggest that you temporarily disable the firewall and click on the **Test Settings** button again.

### Note

*The NetHASP licence manager that we use is not compatible*

*with the newer HASPSRM licence manager and cannot co-exist on the same server.*

#### **155 - LM old version was found**

This message means that the licence manager has been found BUT that it is an old version and needs upgrading. To fix this, download the latest version of the licence manager (v8.32.5.40 at the time of writing) from our web site ([www.savoy.co.uk](http://www.savoy.co.uk)). Go to the **Downloads** page and select **3rd party software and links**. Uninstall the current version from the licence manager machine and install the new version **as a service**. Note that upgrading the licence manager will NOT stop older versions of AutoTrack from running. Note also that during the upgrade process the licence manager machine may need to be re-booted.

#### **129 - NetHASP key is not connected to the NetHASP Licence Manager**

This message means that the only licence manager found does not have a AutoTrack key attached. To fix this, make sure that the key is attached and then carry out the steps to add the IP address of the actual server outlined in the solution to error 15 about.

#### **133 - Number of stations exceeded**

This message means that the licence manager has been found but all the licences are in use. Try again later, or use the Licence Monitor to see who is using the licences and get someone to logout.

---

## **Technical Support**

You may telephone Savoy Computing Services anytime during normal UK working hours on +44(0)1580 720 011. Alternatively you may fax us on +44(0)1580 720 022.

*Normal working hours are 9am to 5.30pm GMT, Monday to Friday, except Bank and National Holidays.*

If it's out of office hours then you might like to try our web site on which we post details of any known problems and how to work around them. The site can be accessed at **[www.savoy.co.uk](http://www.savoy.co.uk)** and you can email us at **[support@savoy.co.uk](mailto:support@savoy.co.uk)**. Both of these are available from the AutoTrack drop down menu.

Finally, you can contact us by post at Savoy Computing Services Ltd., Clermont House, High Street, Cranbrook, Kent, TN17 3DN, England.

# Starting AutoTrack

AutoTrack can be run from within an AutoCAD or MicroStation session, from the taskbar **Start, Programs** menu or from a desktop icon. In future, when this manual refers to AutoTrack it is using the generic term and what each user will see depends on what version they are licenced to use.

---

## Running stand-alone AutoTrack



*Start button*

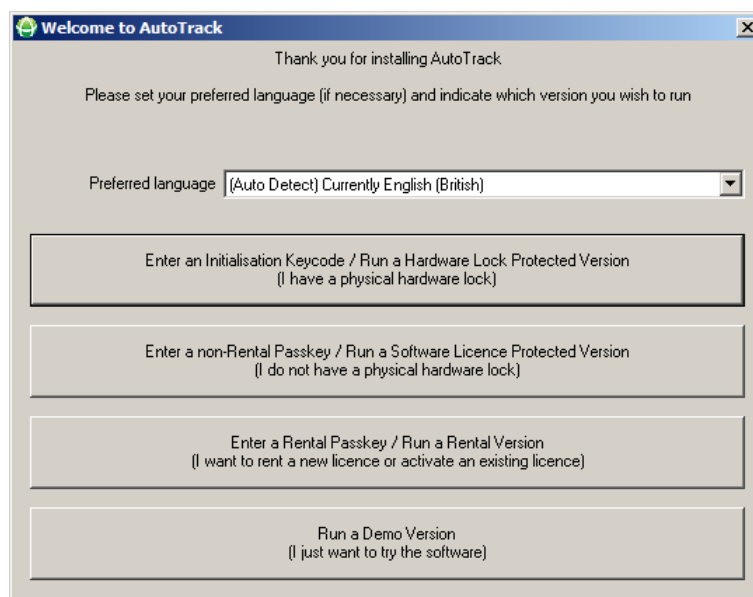
2. Click on the **Start** button on the Taskbar and select **AutoTrack for SavoyCAD** from the Programs, AutoTrack menu or click on the desktop icon **AutoTrack for SavoyCAD**.
3. The first time the software is run, if AutoTrack cannot find a valid licence, the Welcome dialog will appear with options to run a full, rental or demo version. Select the required version.
4. If you are licenced only to use the Templates Standard version or have chosen to evaluate this product then you will see the first page of the Template Wizard.

In all other versions you will be placed in the SavoyCAD editor. AutoTrack should be visible on the top menu bar and the toolbar should also be visible.

---

## Welcome dialog <sup>(1700)</sup>

The Welcome dialog appears the first time the program is run, whenever AutoTrack fails to find a valid licence or following a master reset.



5.

### Welcome dialog

1. By default, the language is detected automatically based upon your computer settings. However, if you would prefer to use a different language select it from the **Preferred Language** drop down list.
2. If you have purchased AutoTrack and have a USB or parallel dongle then simply plug it in and click **Enter and Initialisation Keycode / Run a Hardware Lock Protected Version**.

If you have not yet initialised the dongle you will be prompted to enter the Initialisation Code. (On network versions you may need to edit your Network Settings to tell AutoTrack where to look for the dongle)

If the dongle you have plugged in has already been initialised AutoTrack should just run.

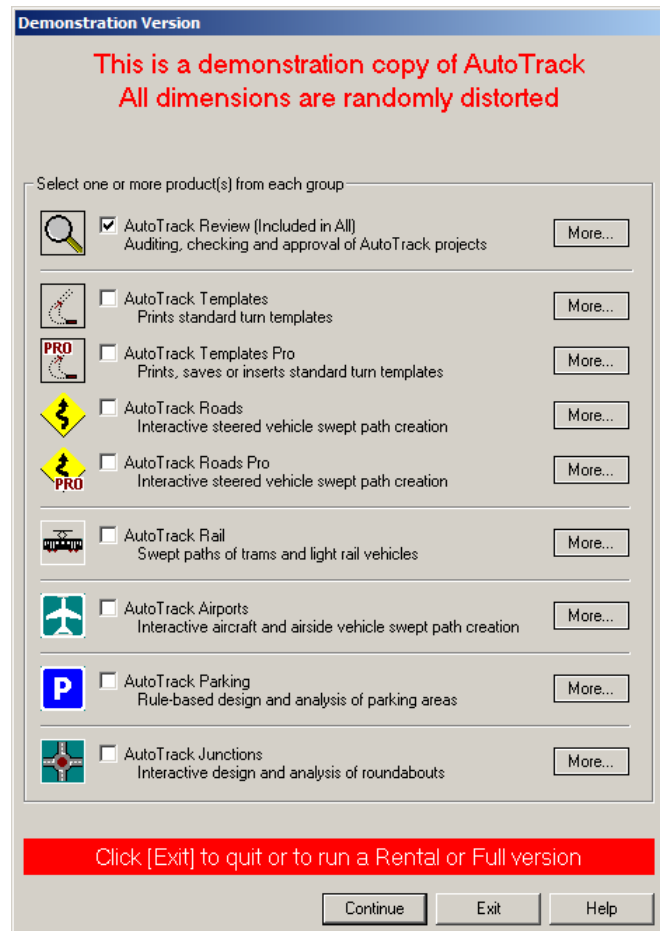
3. If you have purchased AutoTrack and do **NOT** have a hardware lock then click **Enter a non-Rental Passkey / Run a Software Licence Protected Version**. The [Activate Licence dialog](#) <sup>(1840)</sup> will appear.
4. If you want to rent a copy of AutoTrack or receive a rental licence from a colleague, click **Enter a Rental Passkey / Run Rental Version**. The [Rental Version dialog](#) <sup>(1820)</sup> will appear.
5. If you simply want to try out the software click **Run a Demo Version**. The [Demonstration Version dialog](#) <sup>(1800)</sup> will appear.



---

## Demonstration Version dialog <sup>(1800)</sup>

This dialog only appears if you have opted to run a demonstration copy of AutoTrack. It allows you to select and change the product you wish to evaluate.



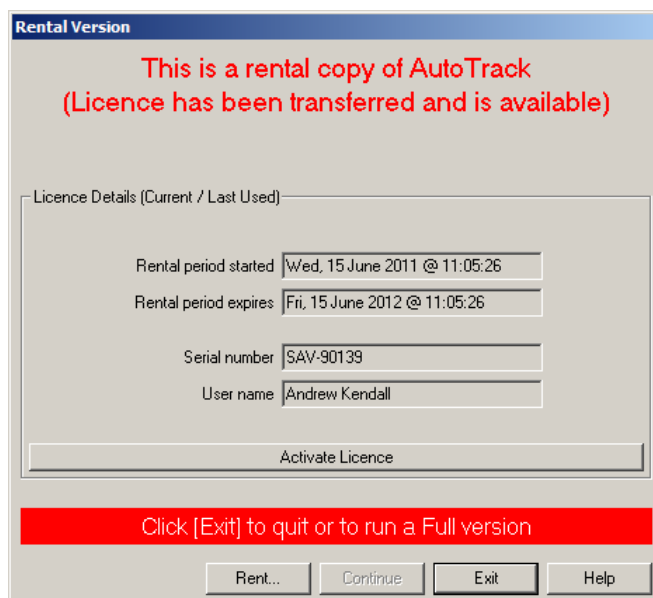
Demonstration Version dialog

1. Select the product(s) that you wish to evaluate.
2. To evaluate the selected product(s) click **Continue**.
3. To quit or to upgrade to a rental or full version, click **Exit** which will display the [Welcome dialog](#) <sup>(1700)</sup>.

---

## Rental Version dialog <sup>(1820)</sup>

This dialog only appears if you are using a rented copy of AutoTrack. Rental copies are managed by a licence and the text at the top indicates the status of that licence. The licence is installed on and applies to only one computer at a time but can be moved between computers as often as you wish.



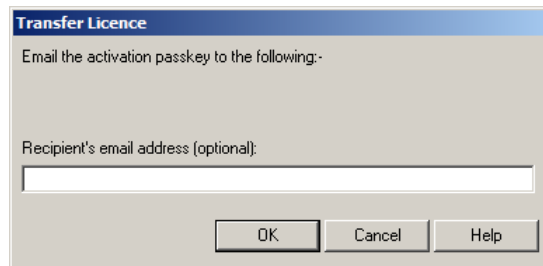
Rental Version dialog

1. If the licence is valid then click **Continue** to use the software.
2. If you have a rental licence on your computer then you may move the rental licence to another computer by clicking **Transfer licence to another computer**. The [Transfer Licence dialog <sup>\(1850\)</sup>](#) will appear.
3. If you do not currently have a rental licence on your computer you can retrieve and activate a transferred licence by clicking **Activate licence**. The [Activate Licence dialog <sup>\(1840\)</sup>](#) will appear.
4. To start a new rental click **Rent**. The AutoTrack Rental Express wizard will appear for you to purchase time. When this has finished you will be returned to the Rental Version dialog and you should then click **Continue** to use the software.
5. To renew or extend an existing rental click **Extend**. The AutoTrack Rental Express wizard will appear for you to purchase more time. When this has finished you will be returned to the Rental Version dialog and you should then click **Continue** to use the software.
6. To quit or upgrade to a full version click **Exit** which will display the [Welcome dialog <sup>\(1700\)</sup>](#).

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## Transfer Licence dialog <sup>(1850)</sup>

This dialog will appear when you opt to transfer an AutoTrack software licence (rental or full) to another computer.



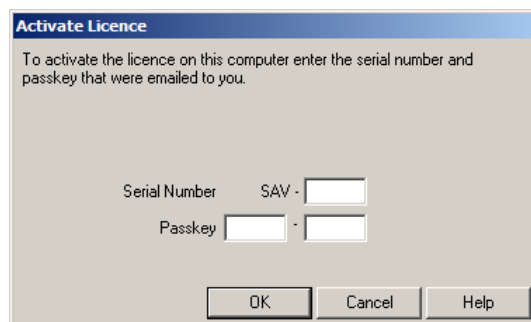
Transfer Licence dialog

1. If you wish to advise a co-worker that this AutoTrack licence is now available enter their email address here. Your colleague will receive an email with details of how to retrieve and activate the licence on their computer. To email multiple users enter their email addresses separated by semi-colons (;). Click **OK**.
2. Your serial number and a passkey will be displayed; use these to activate the licence on any other computer.

---

## Activate Licence dialog <sup>(1840)</sup>

This dialog will appear when you opt to activate a software licence (rental or full).



Activate Licence dialog

1. Enter the serial number and passkey provided by the person transferring the licence. Click **OK**.
2. If you cannot enter the supplied code, or if it is rejected, check that you are using the correct startup option - if you have a USB or parallel hardware lock you should click **Cancel** to return to the [Welcome dialog <sup>\(1700\)</sup>](#) and select the correct option.

### Note

*The original purchaser and anybody who extends the licence period will be emailed each time the licence is transferred. This is for information only and helps ensure that they are able to locate the licence.*

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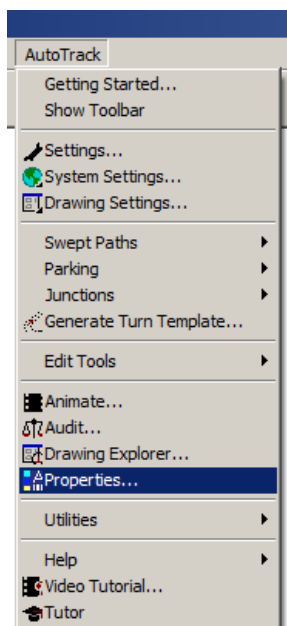
# Running AutoTrack in AutoCAD

AutoTrack can either be run from within an AutoCAD session or from the Taskbar Start Programs menu.

## To run AutoTrack from the Taskbar Start Programs Menu

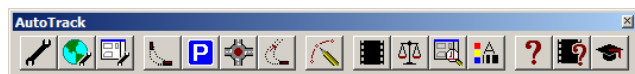


Start button



AutoTrack menu

1. Click on the **Start** button on the Taskbar and select **AutoTrack for AutoCAD 2012** (or your alternative CAD system) from the Programs, AutoTrack menu or click on the desktop icon **AutoTrack for AutoCAD 2012**.
2. The first time the software is run, if AutoTrack cannot find a valid licence, the [Welcome dialog](#) <sup>(1700)</sup> will appear with options to run a full version (hardware lock version), activate a software licence (software locked version), run a rental or a demo version.
3. If you are running a demo copy then you will see the [Demonstration Version dialog](#) <sup>(1800)</sup>. Select which product you wish to evaluate and click **Continue**. If necessary your menus will be reconfigured.
4. AutoTrack paths are only visible to non-AutoTrack users if proxy graphics have been saved with the drawing (for more information, refer to [Viewing AutoTrack paths in AutoCAD if you don't have AutoTrack](#)). In order for these proxy graphics to be saved, several AutoCAD system variables need to be set correctly. If they are incorrect when you start AutoTrack they will be changed and you will be advised on the command line.
5. You will now be placed in the AutoCAD drawing editor and the AutoTrack menu and toolbar should be visible.



AutoTrack toolbar (appearance varies)

6. If the toolbar is not visible select **Show Toolbar** from the AutoTrack drop down menu.

## To run AutoTrack from within AutoCAD

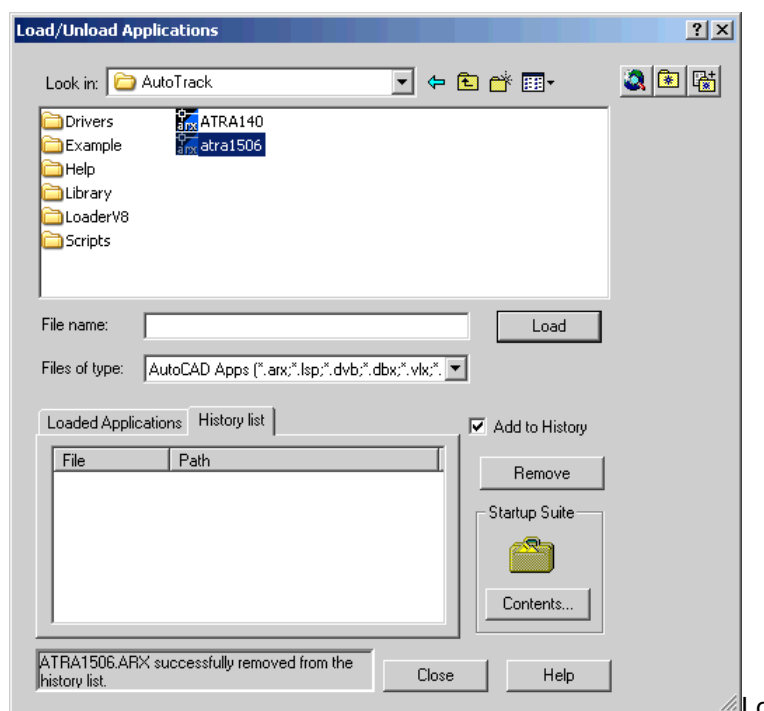
1. Run AutoCAD as you normally would.
2. If your system has been set up correctly AutoTrack should be on the top menu bar. AutoTrack is not yet loaded but will be as soon as you select an AutoTrack command. If the toolbar is not visible then you can select **Show Toolbar** from the AutoTrack drop down menu to display it.
3. Click any AutoTrack button to load AutoTrack. If you are running a network version for the first time, you may get a Hardware Lock warning. Just confirm that you are running a network version and proceed. If AutoTrack fails to find the hardware lock, edit your Network Settings and enter the IP address of the Licence Server.

### Note

By default only the main AutoTrack toolbar is enabled with the other functions available as flyouts. If you prefer to work with the flyouts permanently displayed then click the relevant main toolbar buttons to display them and leave them open when you close AutoCAD. Alternatively on versions of AutoCAD prior to 2006 you may go to View, Toolbars and check the AutoTrack toolbars that you require.

## To load and run AutoTrack for AutoCAD (except Civil 3D 2010 or later) manually

1. Run AutoCAD as you normally would.
2. Select **Load Application** from the **Tools** menu in AutoCAD or type **APPLOAD** at the command line. The Load Application dialog will appear. The dialog shown is for AutoCAD 2002 but other platforms are similar.



Load Application dialog (AutoCAD 2002)

3. Browse to the AutoTrack application directory and select the ARX file appropriate to your CAD system as follows:-

AutoCAD R14 and derivatives use ATRA140.ARX

AutoCAD 2000/2000i and derivatives use ATRA150.ARX

AutoCAD 2002 and derivatives use ATRA1506.ARX

AutoCAD 2004 and derivatives use ATRA160.ARX

AutoCAD 2005 and derivatives use ATRA161.ARX

AutoCAD 2006 and derivatives use ATRA162.ARX

AutoCAD 2007 and derivatives use ATRA170.ARX

AutoCAD 2008 (32-bit) and derivatives use ATRA171.ARX

AutoCAD 2008 (64-bit) and derivatives use ATRA17164.ARX

AutoCAD 2009 (32-bit) and derivatives use ATRA172.ARX

AutoCAD 2009 (64-bit) and derivatives use ATRA17264.ARX

AutoCAD 2010 (32-bit) and derivatives use ATRA180\_ARX.ARX

AutoCAD 2010 (64-bit) and derivatives use  
ATRA18064\_ARX.ARX

AutoCAD 2011 (32-bit) and derivatives use ATRA181\_ARX.ARX

AutoCAD 2011 (64-bit) and derivatives use  
ATRA18164\_ARX.ARX

AutoCAD 2012 (32-bit) and derivatives use ATRA182\_ARX.ARX

AutoCAD 2012 (64-bit) and derivatives use  
ATRA18264\_ARX.ARX

AutoCAD 2013 (32-bit) and derivatives use ATRA190\_ARX.ARX

AutoCAD 2013 (64-bit) and derivatives use  
ATRA19064\_ARX.ARX

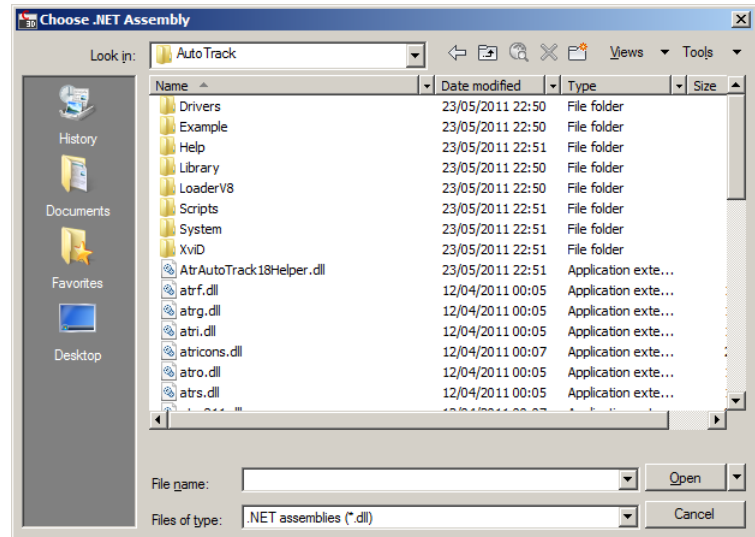
4. Click the **Load** button and close the dialog. AutoTrack will load.
5. Now type **AUTOTRACK** on the command line.
6. If you have installed a demo copy then you will see the [Demonstration Version dialog](#)<sup>(1800)</sup>. Select which product you wish to evaluate and click **Continue**. If necessary your menus will be reconfigured.
7. AutoTrack should now be visible on the top menu and the toolbar should also be visible. If the toolbar is not visible then you can select **Show Toolbar** from the AutoTrack drop down menu to display it.
8. Click any AutoTrack button to load AutoTrack. If you are running a network version for the first time, you may get a Hardware Lock warning. Just confirm that you are running a network version and proceed. If AutoTrack fails to find the hardware lock edit your Network Settings and enter the IP address of the Licence Server.

#### **Note**

*By default only the main AutoTrack toolbar is enabled with the other functions available as flyouts. If you prefer to work with the flyouts permanently displayed then click the relevant main toolbar buttons to display them and leave them open when you close AutoCAD. Alternatively on versions of AutoCAD prior to 2006 you may go to View, Toolbars and check the AutoTrack toolbars that you require.*

## To load and run AutoTrack for AutoCAD Civil 3D 2010 or later manually

1. Run AutoCAD as you normally would.
2. Type **NETLOAD** at the command line. The **Choose .NET Assembly** dialog will appear. The dialog shown is for AutoCAD Civil 3D 2012 but other platforms are similar.



Choose .NET Assembly dialog (AutoCAD Civil 3D 2012)

3. Browse to the AutoTrack application directory and select the .NET file appropriate to your CAD system as follows:-

AutoCAD Civil 3D 2010 (32-bit) and derivatives use  
ATRC180\_ARX.DLL

AutoCAD Civil 3D 2011 (32-bit) and derivatives use  
ATRC181\_ARX.DLL

AutoCAD Civil 3D 2011 (64-bit) and derivatives use  
ATRC18164\_ARX.DLL

AutoCAD Civil 3D 2012 (32-bit) and derivatives use  
ATRC182\_ARX.DLL

AutoCAD Civil 3D 2012 (64-bit) and derivatives use  
ATRC18264\_ARX.DLL

AutoCAD Civil 3D 2013 (32-bit) and derivatives use  
ATRC190\_ARX.DLL

AutoCAD Civil 3D 2013 (64-bit) and derivatives use  
ATRC19064\_ARX.DLL

4. Click the **Open** button and close the dialog. AutoTrack will load.
5. Now type **AUTOTRACK** on the command line.
6. If you have installed a demo copy then you will see the [Demonstration Version dialog](#) <sup>(1800)</sup>. Select which product you wish to evaluate and click **Continue**. If necessary your menus will be reconfigured.

7. AutoTrack should now be visible on the ribbon. It will also be on the menu or toolbar if you have the menu visible. If you prefer to use toolbar you can select **Show Toolbar** from the AutoTrack drop down menu to display it.
8. Click any AutoTrack button to load AutoTrack. If you are running a network version for the first time, you may get a Hardware Lock warning. Just confirm that you are running a network version and proceed. If AutoTrack fails to find the hardware lock edit your Network Settings and enter the IP address of the Licence Server.

## Viewing AutoTrack paths in AutoCAD if you don't have AutoTrack

In the AutoCAD version of AutoTrack the path entity is a custom object that is calculated and drawn by AutoTrack. Systems must therefore have AutoTrack installed in order to update and maintain these objects.

AutoCAD caters for drawings that contain custom objects without their authoring application being present using a system called proxy graphics. Proxy graphics are similar to an anonymous block containing an exploded version of the custom object. However, the proxy graphics will only be visible if certain system variables are set correctly on both the authoring and receiving systems.

### Authoring system

- In order for proxy graphics to be saved with the drawing the authoring system must have the system variable `PROXYGRAPHICS` set to 1 and `INDEXCTRL` set to 3. When you start AutoTrack these are set along with `PROXYSHOW` set to 1 and `DEMANDLOAD` set to 3.

### Receiving system

- If the receiving system has AutoTrack installed and the startup system setting **Load AutoTrack when opening drawing containing AutoTrack data** is switched on, AutoTrack data will be visible just like any other entity. Likewise, if the [AutoCAD object enabler](#) is installed then any AutoTrack data will be visible. For more details of the object enabler refer to [AutoCAD object enabler](#).
- If the receiving system either does not have AutoTrack installed, or has AutoTrack installed but **Load AutoTrack when opening drawing containing AutoTrack data** is switched off, AutoCAD will report the missing application only if the system variable `PROXYNOTICE` is set to 1. This prompt may give the user options **Show proxy graphics** and/or **Do not show proxy graphics**. Note however that if proxy graphics have not been saved with the drawing (see above) then even opting to **Show proxy graphics** will not make them visible. Note also that if the default was **Do not show proxy graphics** and you select **Show proxy graphics** then you will need to issue a `REGEN` in order to see the objects.
- If you decide not to show the proxy graphics at the start then setting `PROXYSHOW` to 1 will make them visible after the next `REGEN` if they are saved in the drawing.



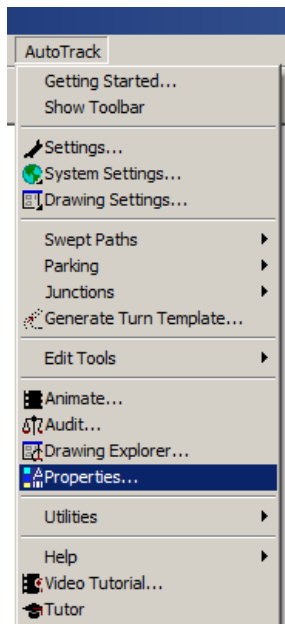
## Running AutoTrack in MicroStation

AutoTrack can either be run from within a MicroStation session or from the Taskbar Start Programs menu.

## To run AutoTrack from the Taskbar Start Programs menu...



Start button



### AutoTrack menu

1. Click on the Start button on the Taskbar and select **AutoTrack for MicroStation V8i** (or your alternative CAD system) from the Programs, AutoTrack menu or double-click on the desktop icon **AutoTrack for MicroStation V8i**.
2. Create and/or open a drawing.
3. The first time the software is run, if AutoTrack cannot find a valid licence, the Welcome dialog will appear with options to run a full, rental or demo version. Select the required version.
4. If you have installed a demo copy then you will see the [Demonstration Version dialog](#)<sup>(1800)</sup>. Select which product you wish to evaluate and click **Continue**. If necessary your menus will be reconfigured.
5. You will be placed in the MicroStation drawing editor. AutoTrack should be on the Applications menu and the tool frame should also be visible docked on the left.



AutoTrack toolframe (Appearance varies)

6. Click any AutoTrack button to load AutoTrack. If you are running a network version for the first time, you may get a Hardware Lock warning. Just confirm that you are running a network version and proceed. If AutoTrack fails to find the hardware lock edit your Network Settings and enter the IP address of the Licence Server.

## To run AutoTrack from within MicroStation...

1. Run MicroStation as you normally would.
2. Create and/or open a drawing.
3. If you have installed a demo copy then you will see the [Demonstration Version dialog](#)<sup>(1800)</sup>. Select which product you wish to evaluate and click **Continue**. If necessary your menus will be reconfigured.
4. If your system has been set up correctly AutoTrack should be on the **Applications** menu. The AutoTrack tool frame may also be visible. AutoTrack is not yet loaded but will be as soon as you select an AutoTrack command.
5. Click any AutoTrack button to load AutoTrack. If you are running a network version for the first time, you may get a Hardware Lock warning. Just confirm that you are running a network version and proceed. If AutoTrack fails to find the hardware lock edit your Network Settings and enter the IP address of the Licence Server.

### Note

*By default only the main AutoTrack tool frame is enabled with the other functions available as flyouts. If you prefer to work with the flyouts permanently displayed then go to Tools, Toolboxes and check the AutoTrack toolbars that you require.*

## To load and run AutoTrack for MicroStation manually...

1. Run MicroStation as you normally would.
2. If you are running Bentley MX the Utilities menu may not be visible. Select **CAD Menu** from the File drop down menu.
3. Select MDL Applications from the Utilities menu.
4. Look for **ATRACK** in the list of Available Applications.
5. If the application is listed then highlight it and click **Load**. Close the MDL Applications dialog.
6. If the application is not listed then click the **Browse** button and look in the `LOADER` subdirectory (`LOADERV8` on MicroStation V8) of the AutoTrack installation directory for the file `ATRACK.MA`. Highlight the file and click **OK** followed by **Load**.
7. If you have installed a demo copy then you will see the [Demonstration Version dialog](#) <sup>(1800)</sup>. Select which product you wish to evaluate and click **Continue**. If necessary your menus will be reconfigured.
8. AutoTrack should now be visible on the top menu and the toolbar should also be visible.
9. Click any AutoTrack button to load AutoTrack. If you are running a network version for the first time, you may get a Hardware Lock warning. Just confirm that you are running a network version and proceed. If AutoTrack fails to find the hardware lock edit your Network Settings and enter the IP address of the Licence Server.

### Note

*By default only the main AutoTrack tool frame is enabled with the other functions available as flyouts. If you prefer to work with the flyouts permanently displayed then go to Tools, Toolboxes and check the AutoTrack toolbars that you require.*

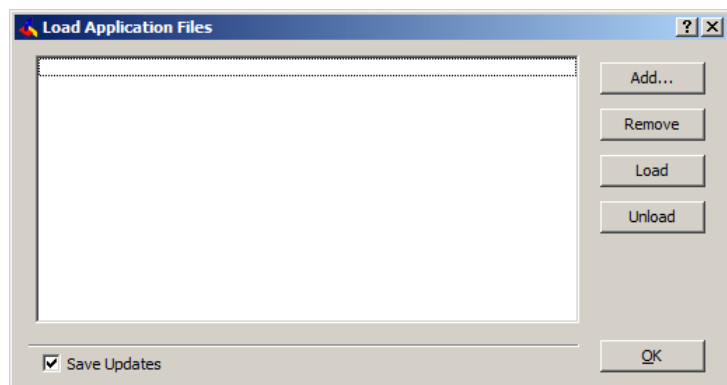


### Note

By default only the main AutoTrack toolbar is enabled with the other functions available as flyouts. If you prefer to work with the flyouts permanently displayed then click the relevant main toolbar buttons to display them and leave them open when you close BricsCAD.

## To load and run AutoTrack for BricsCAD manually

1. Run BricsCAD as you normally would.
2. Select **Load Application** from the **Tools** menu in BricsCAD type **APPLoad** at the command line. The Load Application Files dialog will appear. The dialog shown is for BricsCAD v11 but other platforms are similar.



Load Application Files dialog (BricsCAD)

3. Browse to the AutoTrack application directory and select the BRX file appropriate to your CAD system as follows:-

BricsCAD v11.1 use ATRB1101.BRX

BricsCAD v11.2 use ATRB1102.BRX

BricsCAD v11.3 use ATRB1103.BRX

BricsCAD v11.4 use ATRB1104.BRX

BricsCAD v12.1 use ATRB1201.BRX

BricsCAD v12.2 use ATRB1202.BRX

4. Click the **Load** button and close the dialog. AutoTrack will load.
5. Now type **AUTOTRACK** on the command line.
6. If you have installed a demo copy then you will see the [Demonstration Version dialog](#)<sup>(1800)</sup>. Select which product you wish to evaluate and click **Continue**. If necessary your menus will be reconfigured.
7. AutoTrack should now be visible on the top menu and the toolbar should also be visible. If the toolbar is not visible then you can select **Show Toolbar** from the AutoTrack drop down menu to display it.

8. Click any AutoTrack button to load AutoTrack. If you are running a network version for the first time, you may get a Hardware Lock warning. Just confirm that you are running a network version and proceed. If AutoTrack fails to find the hardware lock edit your Network Settings and enter the IP address of the Licence Server.

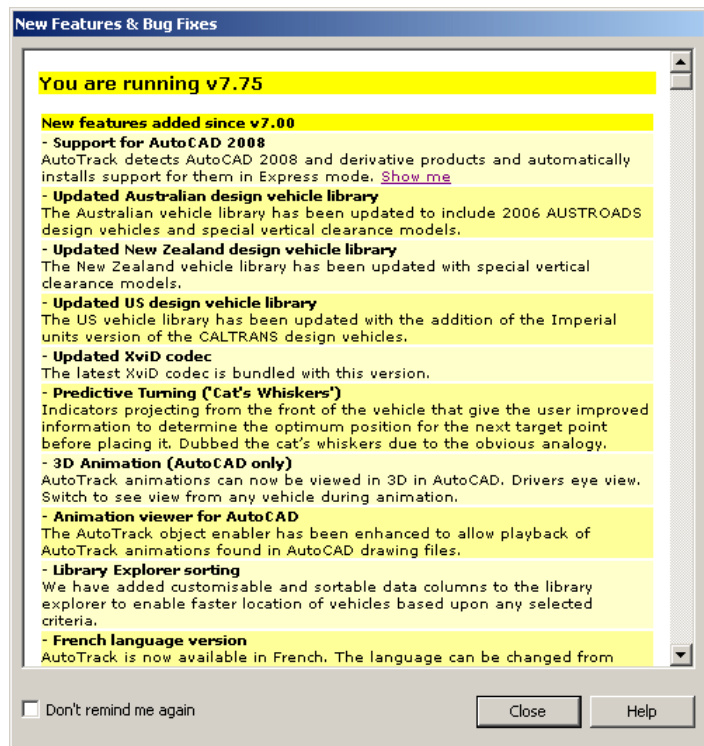
**Note**

*By default only the main AutoTrack toolbar is enabled with the other functions available as flyouts. If you prefer to work with the flyouts permanently displayed then click the relevant main toolbar buttons to display them and leave them open when you close BricsCAD.*

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## The New Features dialog (1975)

If you have an internet connection then you will see the New Features dialog when you run AutoTrack. If you do not see the dialog then it may be because it has been switched off. In this case select **Show New Features** from the AutoTrack, Help drop down menu.



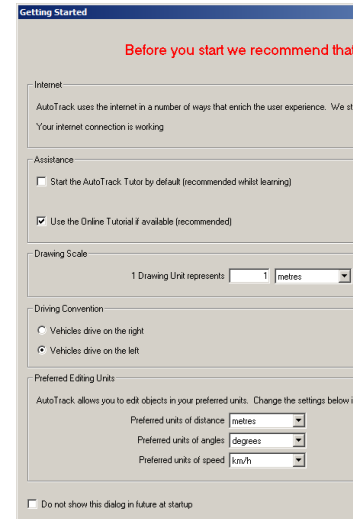
New Features dialog

1. If you are installing AutoTrack for the first time the main window lists the new features add to this major release, e.g. if you are installing v8.9 it will list all new features from version 8.0.
2. If you have just updated from an earlier version the main window lists the new features available since the last version you used. Thus if you update from version 7.0 it will list all new features from that version.
3. If you don't want to be reminded of new features again then tick **Don't remind me again**. You can always see check the list again by selecting **Show New Features** from the AutoTrack, Help drop down menu.
4. Some of the items may include links to video clips. To view these simply click the **Show me** link.

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# The Getting Started dialog (not AutoTrack Templates) (1900)

For those who use AutoTrack infrequently we have created the Getting Started dialog. By default this appears when you first run the program from the desktop icon.



6.

## Getting Started dialog

1. At the top of the screen is the Internet status. AutoTrack provides extra functionality via the internet and we strongly recommend that it is enabled. If the status indicates that there is a problem then click on the **System Settings** button to make changes.
2. Below that is the Assistance section. The AutoTrack Tutor is not new but now you can have it run at startup; tick **Start the AutoTrack Tutor by default**. There may be a static tutorial provided with the product but for the most up to date information and advice we recommend that you access the online tutorial by ticking **Use the Online Tutorial if available**. The tutorial will run in your preferred browser and the window may need to be resized to view the page format. Click on the **Tutor** button or **Video Tutorial** button to start these features.
3. Below that is possibly the single most important settings, **Drawing Scale**. Enter your preferred scale or click the **Drawing Settings** button to configure other drawing settings.
4. The **Driving Convention** is set based upon your regional settings. You may change it if it is wrong.
5. The **Preferred Editing Units** control the units in which data is displayed. If you also wish to view or change the Reporting Units then click the **Drawing Settings** button.
6. When you become proficient with AutoTrack you may wish to disable the Getting Started dialog by ticking the box **Do not show this dialog in future at startup**. You can always display it again by selecting **Getting Started** from the AutoTrack drop down menu.



*System Settings button*



*Tutor button*



*Video Tutorial button*



*Drawing Settings button*



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## A few do's and don'ts

We have designed AutoTrack to support and interact appropriately with as many of the features of the host CAD system. However, there are a few recommended do's and don'ts that you should bear in mind.

### AutoCAD version

- **Do not** save only exploded AutoTrack paths if you are likely to need to edit them in the future.

### MicroStation version

- **Do not** save only exploded AutoTrack paths if you are likely to need to edit them in the future.
- **Do not** unlock or edit the AutoTrack cells using other than AutoTrack. Each AutoTrack path is held in one or more specially named locked cells (belonging to the same graphic group) to prevent it being manipulated such that the results are inconsistent with the vehicles capabilities. Unlocking or editing cells will have unpredictable results.
- **Do not** try to edit AutoTrack data in reference drawings - AutoTrack can only access data in the master drawing.



# Introduction

AutoTrack's power and range of features has grown over the years and it is now no longer a single program but a suite of vehicle swept path prediction programs. It was originally developed to meet the need for a means of accurately predicting the space needed to manoeuvre large articulated vehicles. Nowadays, the program can model almost any conceivable vehicle type including vehicles with complex steering arrangements, aircraft and now, following the recent integration of AutoTram, light rail vehicles.

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## What AutoTrack can and can't do

### Capabilities

AutoTrack integrates completely with your CAD system adding functions that allow you to model vehicle behaviour. You simply select from a wide variety of predefined vehicles and 'drive' them through required manoeuvres on-screen. If the required vehicle is not already defined then facilities are provided to define the vehicle and add it into one of the existing libraries for future use.

#### Note

*If you are a new AutoTrack user, or have migrated from a previous version, we strongly recommend that you view the demonstration video supplied on the AutoTrack CD to gain an overview of the product. Then, for a hands-on introduction to using the program refer to the section entitled Worked Example.*

### Features

A number of features have been incorporated to simplify the user's task in "driving" a vehicle in this manner without the benefit of the more direct sensory feedback that would be experienced driving the vehicle for real.

It should be noted that the aim of the program is to provide accurate swept path predictions for different types of vehicles and not precise simulations of driving conditions for those vehicles. Thus, the controls have been designed with the emphasis on ease of use rather than realism.

### AutoCAD Civil 3D 2010 and later

We work hard to ensure that AutoTrack functionality is the same across all platforms as far as we can. However, AutoCAD Civil 3D presents us with an opportunity to enhance the functionality to the benefit of the end user. These special features (only available in version 2010 and later) are made possible by the detailed Civil 3D building information model (BIM) database that identifies lines and shapes and allows us to add intelligence to our AutoTrack objects. For example, Civil 3D surfaces and

feature lines allow us to place our objects on the ground surface. Not only that but we are able to react and update the object when the surface or line changes. These features are discussed in more detail as they occur in the manual.

## Limitations

Like any engineering design program, AutoTrack has limitations. In fact, the list of factors that AutoTrack ignores is extensive and includes dynamic effects, wind effects, acceleration and deceleration, sloping road surfaces and slippery road surfaces.

Whilst these factors are by no means irrelevant, if we asked you to supply a weather report, details of the condition of each tyre, a road friction coefficient and full details of the suspension you would probably give up and go back to using templates!

The fact is that AutoTrack is just like any other engineering program in which you design for idealised situations and apply safety factors to allow for real life variations.

This is exactly the way we recommend you use AutoTrack. Use the most onerous vehicles likely in a particular situation and then allow a margin for error on the results. The acceptable margin for error is something for you to assess - if you are lucky it may be the subject of local design guidelines.

Do not expect that just because a particular vehicle in the AutoTrack library can perform a given manoeuvre on your desktop you will be able to replicate it precisely in reality.

Do not assume that any of the AutoTrack defaults are recommendations and if you have a reliable source of data, use it.

It all boils down to USE YOUR ENGINEERING JUDGEMENT.

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## Migrating from WinTrack

Due to restrictions imposed by Windows Vista support AutoTrack can no longer read WinTrack files directly. If you need to migrate WinTrack files for use with AutoTrack you should install version 7.60 or earlier, open the file and save it. The resulting file supports almost all WinTrack features. Features not supported include:-

- Speed, hands-off and stationery steering reports (planned for a later release)
- Full thickness tyre tread report (although tyre tread reports are read in as normal outer face wheel tracks if there is no outer face report defined)
- Alternative direction symbol shapes (only the chevron shape)
- Automatic grid spacing (however grid spacing may be specified)
- Origin symbol (replaced by axes symbol at bottom left of screen)

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## Reading pre-v5 AutoTrack libraries

Due to restrictions imposed by Windows Vista support AutoTrack can no longer read library files created using version of AutoTrack prior to version 5. If you need to convert an earlier format library file you should

install version 7.60 or earlier, open the file and save it. The resulting file can be read in all versions of AutoTrack.

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## How to use AutoTrack

AutoTrack is really very simple to use; in most cases you will simply specify your settings, select a vehicle from one of the many provided, position and orient it on your drawing and then drive it through your drawing on-screen. If you need a vehicle that is not listed then you can create it, add it to your own vehicle library and use it just like those provided.

Each of these is described in detail in the following chapters.

### Settings

How you use AutoTrack depends to a large extent upon what you want to do with it. The system is set up with default settings appropriate for a “typical” use. You will need to decide whether these are appropriate for your needs and change them if necessary.

The way a vehicle behaves is controlled partly by the vehicle parameters and partly by the environment in which it is driven. Vehicles once defined should normally be regarded as fixed. The environment settings however can and should be modified to suit your particular situation.

There are various drive modes available each of which can be used interchangeably. Each is appropriate for a particular use and you will need to decide which is best for your needs and indeed this may come down to a simple preference. All but one of the drive modes also have settings that control the way they work.

One of the most frequent causes of problems is that AutoTrack is working in one set of units (say, metres) while your CAD system is working in another (say, millimetres); so before you start work make sure that you set the AutoTrack scale to match your drawing (Refer to Drawing Settings: Scale).

AutoTrack calculates swept paths to a high degree of accuracy based upon the stated algorithms. However, you may wish to allow for the driver error or real world imperfections by modelling a safety or clearance envelope (Refer to Drawing Settings: Reports: Offset Envelope 1).

### Modelling rigid vehicles

All drive modes are well suited to modelling rigid vehicles but AutoDrive is likely to give the quickest and best results.

### Modelling articulated semi-trailer vehicles

Articulated lorries are best modelled using AutoDrive. Existing users may prefer Manual Drive which requires a degree of skill when reversing. Follow and Script may be appropriate if you are only modelling forwards manoeuvres. If you want to model reverse manoeuvres Script is unlikely to be of much use since it has no intelligence to deal with the over-articulation that will rapidly develop.

## Modelling drawbar and multi-trailer vehicles

Multi-trailer vehicles that have more than one articulation point are inherently very unstable when reversing and for this reason they are rarely reversed. We do not encourage the use of AutoTrack to analyse multi-trailer vehicles performing reversing manoeuvres since it can give a false impression of the suitability of the design. Within AutoTrack, AutoDrive will give you good results.

## Modelling aircraft

Taxiing aircraft are best modelled using either AutoDrive or Follow. Script may also be appropriate if you want to create templates of well-defined simple manoeuvres.

Follow will be appropriate if you want to model an aircraft following existing apron markings. If you want pilot's eye tracking then you will need to change the Forwards Path Point to Pilot / Driver (Refer to Drawing Settings: Tracking Point). This must be done **before** you start driving. If your vehicle fails to negotiate a turn then you could try lengthening the segment length (Refer to System Settings: Follow Drive). The further the pilot is offset from the effective front axle the greater this value may need to be.

AutoDrive may be more appropriate if you are trying to determine the position of the apron markings. You will probably use the Forwards Arc option in AutoDrive which tries to drive with the minimum turn arcs and only use Forwards Bearing for long straight sections.

## Modelling combination steered vehicles

Linkages have little effect on the most appropriate drive mode. However, rear steered vehicles do not have the benefit of Hands-Off in Manual Drive mode or Forwards Bearing in AutoDrive.

It is only possible to link entire axle groups so the best way to model a single linked axle in a multi-axle group is as a self-steered axle. Set the axle group type to **Fixed** and check the **Self-Steered** box on the axle that is linked. By default, with a self steered friction factor of 0.0, the effective axle position will be calculated on the basis of the remaining fixed axles and the wheels on the self-steered axle will turn about the centre of turn of these axles.

## Modelling vehicles with pushing tractors

All vehicles must have a single tractor unit but it may be at the front, at the back or indeed, in the middle. In essence the behaviour of such a vehicle travelling forwards is equivalent to the reverse of the vehicle going backwards.

## Modelling vehicles with steerable couplings

Some vehicles, notably certain quarrying trucks, have no steerable axles but instead are steered by changing the articulation angle of a coupling. These vehicles can be modelled using the active steerable coupling type.

## Modelling Active Hitches

Warehouse vehicles sometimes make use of vehicles with active hitches. Active hitch refers to a rear drawbar axle which is linked to the front axle

or coupling. Vehicles that use this type of axle can only be reversed using Manual Drive.

## **Development & planning scenarios**

AutoTrack may be used not only to test scenarios but also to develop alignments from scratch. Used in this way you may find the need to limit the steering angle. This can be done in several ways but arguably the most useful in a development situation is by turn radius. For example, if you were to adopt a standard curve radius for a residential development; this radius can then be set as the limiting inner wheel radius for all turns and all vehicles.

During the early planning stages of projects you may find that the good old turn template comes into its own. You could use the template wizard to generate templates for important vehicles such as refuse trucks and emergency vehicles and use them to form the basis of your road layouts. As you refine your design you can then use more sophisticated tools to test critical locations. You should bear in mind that turns generated using Script can be edited whereas those generated using the template wizard cannot.

## **Modelling the effects of super elevation and side friction**

AutoTrack now allows you to restrict the turning radius according to super elevation and side friction. This, in conjunction with design speed, means that you can now more accurately predict higher speed paths through junctions or roundabouts. We do however urge caution before modelling high speed manoeuvres using AutoTrack; the dynamics of vehicle motion are too complex for a program of this type to fully model so the fact that AutoTrack can generate a theoretical path does not necessarily mean that it can be driven safely. **USE YOUR ENGINEERING JUDGEMENT.**

## **Modelling trams and light rail vehicles**

You can only model fully rail guided vehicles such as trams using Guided Drive which is available in the light rail version. Generally speaking because the path of the tram is well defined there are fewer options. However because most new tram networks use new tram designs (albeit often heavily based upon existing trams) it is more likely that you will need to define your own vehicles.

## **Modelling conveyor systems**

The Rail version can also be used to model certain types of conveyor systems such as are found in vehicle assembly plants.

## **Fastest line through roundabouts**

Follow can be used to check the fastest line through roundabouts. Define the path through the roundabout as a AutoCAD spline, pline or MicroStation complex chain. Set the design speed to the highest permitted and use Follow to generate a non-editable path. AutoTrack will reduce the speed to the maximum possible. The current version does not take into account acceleration and deceleration but it does allow for dynamic effects.

## Checking vertical clearances

The Vertical Clearance drive mode may be used to check ground clearance and / or impacts with overhead features such as bridges. Multiple axles are modelled assuming suspension movement. However, the results should be regarded as approximate since the effects of variations in suspension and loading can have a significant effect.

---

## What's new in version 10?

### Support for AutoCAD 2013 and derivatives

AutoTrack detects AutoCAD 2013 and all verticals and automatically installs support for them in Express mode.

### Support for MicroStation v8i SS3

AutoTrack detects MicroStation v8i Select Series 3 and automatically installs support for them in Express mode.

### Support for BricsCAD 12.2

AutoTrack detects BricsCAD v12.2 and automatically installs support for it in Express mode.

### Creation of 3D corridor

Junctions can optionally create and update roadway alignments, profiles and corridor in supported CAD systems. Assemblies are provided for 'out-of-the-box' functionality. A new corridor settings page allows you control default behaviour and save defaults for future sessions.

### New Deviation Points

The Blend Points have been supplemented by Deviation Points. Each arm now has the original Blend Point, the point at which the new design meets the existing, and a Deviation Point, the point at which the arm deviates from the selected alignment.

### Roundabout crown lines

Junctions can optionally create circulatory area crown lines either as concentric circles or island to island. It can also create the arm crown lines using the Stockdale Method.

### Roundabout signage

You can now define non-custom roundabout signs in junction standards. These include Give Way (or Yield), Roundabout Ahead, direction chevrons, etc. The signs are placed automatically but may be adjusted.

### Roundabout levels

You can now specify the levels and crossfall at key points on the roundabout and approach arms. This data is used to build the 3D model in supported CAD systems.

### Ability to run ARCADY from within AutoTrack

An option has been added to start up **ARCADY** from a button on the AutoTrack menu, toolbar or ribbon.

### Ability to run Sign Design Pro from within AutoTrack

An option has been added to start up **Sign Design Pro** from a button on the AutoTrack menu, toolbar or ribbon.

### Roundabout reacts to changes in defining lines in MicroStation



The AutoTrack roundabout object reacts to changes in the chosen alignments in MicroStation in the same way that it does already in AutoCAD.

### Roundabout visibility cameras

3D animation cameras have been added at all visibility subject locations to allow visibility checking in 3D. Also, the drivers eye view can be set to 'Looking Left' and 'Looking Right'.

### New 'watching' cameras

Additional cameras have been added with predefined default viewpoints for watching junctions or parking rows.

### Unlimited design vehicles in Junctions

The Design Vehicle pages in the Junction Standard Editor and Junction Properties have been revised and now you can define and use unlimited design vehicles.

### Improved crossing presentation

The pedestrian crossing is now drawn with white stripes similar to the requirements of many countries.

### Griptips & Glyphs in BricsCAD 12.2

Griptips and glyphs (with varying shapes and colours) are now fully supported in the BricsCAD 12.2 version.

---

## Manual layout

If the theory and algorithms used in AutoTrack are new to you then you may wish to read the section entitled Theory before using the program. Thereafter, the remaining sections cover day-to-day use of the program. We do however strongly recommend that you read the section entitled Worked Example which will give you a fast introduction to the program and get you productive as quickly as possible.

The troubleshooting section deals with some of the more common problems.

## Notation conventions

Throughout this manual key depressions are shown enclosed by angle brackets thus enter <F> means type the letter F and <OR> means type the letters O and R.

Menu options or commands are printed in a **bold** font.

Messages displayed by AutoTrack are printed in *italics*.

Text that you should type and filenames are shown in a `courier` font.

All screen images and functionality descriptions are for AutoTrack running on Windows XP. The screen image may vary slightly on other platforms. If functionality is different for other platforms the variations are noted.

## Mouse conventions

Windows allows mouse button functionality to be reversed for left handed users. AutoTrack features a similar option. Rather than repeatedly catering for all possible configurations we have adopted the convention of using the default functionality. Thus if you have configured your mouse

for left handed use then for left mouse button read right mouse button and vice versa.

## Default values

Throughout the program default values are displayed in red and have an asterisk alongside them. Enter any non-zero value to overwrite the default. Enter zero to reset them to the default.

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## Getting help

If the user manual is not available try one of the alternatives.

### Context sensitive on-line help

The extensive context sensitive on-line help mirrors the manual, but has the powerful windows search facilities. To get help click the **Help** button on any dialog or press **F1**.

Help is also available from the drop down menus:-

Select **Help, AutoTrack Help** to get a structured breakdown of the help text.

Select **Help, About AutoTrack** to check the program module versions.

### On-line assistance

If you find what you think is a bug and wish to email support for assistance select **Email Savoy Computing for assistance** from the **Help** menu.

You can check for updates by selecting **Check website for AutoTrack updates** from the **Help** menu.

### Help tutor

The AutoTrack Tutor is an AutoTrack help window that is displayed permanently in a convenient location on your desktop. The text updates as you move through the program. You can enable the help tutor at any time by clicking the Tutor button on the AutoTrack toolbar. We recommend that you set it to remain in the foreground at all times.



*Tutor button*

### Online video tutorial

The AutoTrack online video tutorial is a multi-media presentation designed to get you started with AutoTrack quickly. Video clips show you how to use AutoTrack to perform various tasks. It may be viewed as a continuous presentation or you may use the navigation buttons to view selected clips.



*Video Tutorial button*

# Settings

There are two types of settings, system and drawing. System settings apply to all drawings and are saved on the computer. Drawing settings apply within a drawing are saved with the drawing.

---

## Settings Wizard

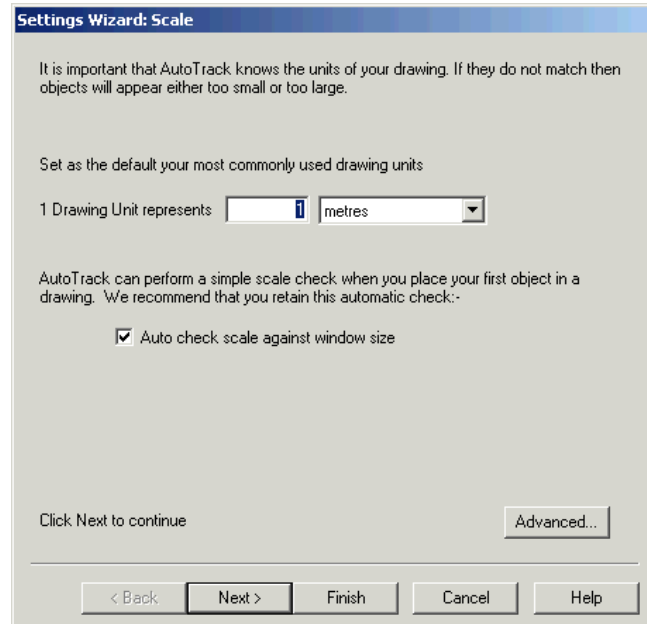
The Settings Wizard is design to help new and infrequent users to configure AutoTrack correctly. The wizard does not allow you to edit all settings but on every page there is an **Advanced** button that takes you to the Settings tabbed dialog.

Also on every page is a **Finish** button. This applies any changes made so far for the current session only. If you want to make the changes apply to future sessions then click **Next** until you get to the Finish page.



Settings button

1. Select **Settings** from the AutoTrack drop down menu or click the **Settings** button on the AutoTrack toolbar or type `ATRASETTINGS` on the command line. The Settings Wizard will appear.



Settings Wizard: Scale

2. Click the **Advanced** button to go directly to the advanced settings dialog.
3. Click **Next** to move to the next page.

## Settings Wizard: Scale <sup>(2400)</sup>

Settings Wizard: Scale

It is important that AutoTrack knows the units of your drawing. If they do not match then objects will appear either too small or too large.

Set as the default your most commonly used drawing units

1 Drawing Unit represents  metres

AutoTrack can perform a simple scale check when you place your first object in a drawing. We recommend that you retain this automatic check:-

☒ Auto check scale against window size

Click Next to continue

Advanced...

< Back Next > Finish Cancel Help

### Settings Wizard: Scale

1. Set the drawing units.
2. We recommend that you tick **Auto check scale against window size** since this will warn you if your scale appears to be wrong.
3. Click **Next** to move to the next page.

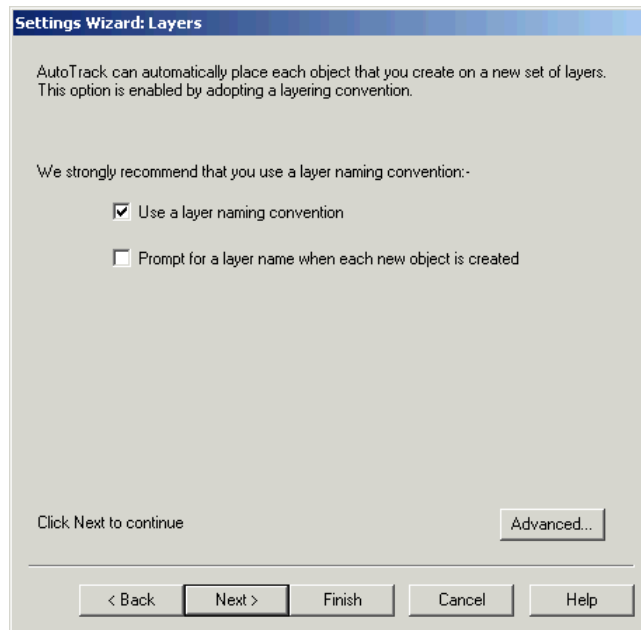
## Settings Wizard: Editing Units <sup>(2410)</sup>

The screenshot shows a dialog box titled "Settings Wizard: Vehicle Editing Units". Inside the dialog, there is a text box that says "The vehicle dimensions can be displayed in whatever units you prefer to work in." Below this text box are three dropdown menus. The first is labeled "Preferred distance units" and has "metres" selected. The second is labeled "Preferred speed units" and has "km/h" selected. The third is labeled "Preferred angular units" and has "degrees" selected. At the bottom of the dialog, there is a row of five buttons: "< Back", "Next >", "Finish", "Cancel", and "Help". Above the "Next >" button, there is a small text box that says "Click Next to continue" and a button labeled "Advanced...".

### Settings Wizard: Editing Units

1. The editing units determine the units used to display data.
2. Use the drop down list boxes to set your preferred units for distance, speed and angles.
3. Click **Next** to move to the next page.

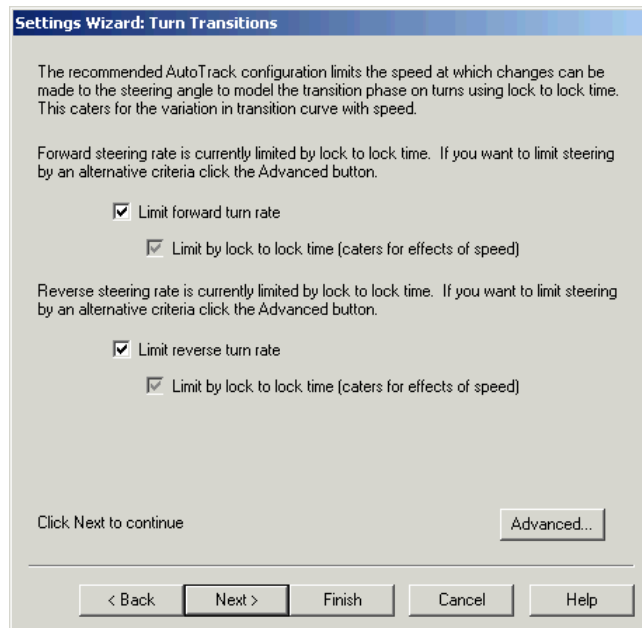
## Settings Wizard: Layers <sup>(2420)</sup>



Settings Wizard: Layers

1. If you are using a CAD system that does not support layer naming then you will not see this page.
2. We recommend that you tick **Use a layer naming convention** so that objects you create are placed on separate named layers. Note that if you tick this option in the wizard it will set the Savoy Basic naming convention. If you want to set another convention click on the **Advanced** button and do so in the advanced **Layers** settings dialog.
3. Tick **Prompt for a layer name** to be offered the opportunity to change the layer name before the object is placed.
4. Click **Next** to move to the next page.

## Settings Wizard: Turn Transitions (2440)



Settings Wizard: Turn Transitions

1. In reality it is not good driving practice to turn the steered wheels whilst the vehicle is stationary. We therefore recommend that you limit turn rates. To do this tick **Limit forward turn rate** or **Limit reverse turn rate**.
2. The most realistic way to limit turn rates is by lock to lock time. So if, for example, you tick Limit forward turn rate then the steering rate criteria is automatically set to **Limit by lock to lock time**. Likewise for Limit reverse turn rate.
3. You can remove steering rate limits by unticking Limit forward turn rate but if you want to adopt different limiting criteria click the **Advanced** button and do so in the advanced **Transitions** settings dialog.
4. Click **Next** to move to the next page.

## Settings Wizard: Design Speed <sup>(2430)</sup>

The screenshot shows a dialog box titled "Settings Wizard: Design Speed". It contains two paragraphs of text explaining the purpose of the design speed settings. Below the text are two input fields: "Forwards design speed" with a value of 8 and "Reverse design speed" with a value of 2.5, both followed by a "km/h" unit dropdown menu. At the bottom, there is a "Click Next to continue" instruction, an "Advanced..." button, and a row of five buttons: "< Back", "Next >", "Finish", "Cancel", and "Help".

Settings Wizard: Design Speed

Depending upon the selected turn transition criteria, the design speed may affect how tightly the vehicle can turn. It will always affect the real-time animation.

You have chosen to limit turning by lock to lock time in one or both directions. The design speed therefore affects how tightly the vehicle can turn. The lower the speed the tighter the vehicle can turn.

Forwards design speed  km/h

Reverse design speed  km/h

Click Next to continue

Advanced...

< Back   Next >   Finish   Cancel   Help

### Settings Wizard: Design Speed

1. The design speed can affect the turning capabilities of the vehicle if you have limited turning by lock to lock time.
2. Even if you have not selected speed related turn transitions the design speed will affect the animation speed.
3. Click **Next** to move to the next page.



## Settings Wizard: Steering Limits <sup>(2450)</sup>

Settings Wizard: Steering Limits

AutoTrack models the behaviour of vehicles as accurately as possible. It incorporates no safety factors or margins of any kind.

Steering is currently not limited. You may enable as many or as few of the following limits as you wish.

☐ Limit steering to percent  %

☐ Limit steering to angle  deg

☐ Limit steering to radius  m

Click Next to continue

Advanced...

< Back   Next >   Finish   Cancel   Help

### Settings Wizard: Steering Limits

1. You can limit the steering in three ways mutually inclusive ways, i.e. you can switch them all on and AutoTrack will determine the most onerous case and use that.
2. Tick **Limit steering to percentage** and edit the value to prevent the steering from exceeded the stated percentage of its maximum lock capability.

#### Note

*This is the only way to limit the steering lock in a vehicle independent way.*

3. Tick **Limit steering to angle** and edit the value to prevent the steering lock exceeding a specified angle (in either direction).
4. Tick **Limit steering to radius** and edit the value to prevent the steering lock exceeding a value that would cause the vehicle to turn tighter than the specified radius. Note that you can specify where the radius is measured, Inner wheel, Inner body, etc.
5. Click the **Advanced** button to set these values in the Model Settings dialog (see [Drawing Settings: Paths: Model \(Roads & Airports\)](#)).
6. Click **Next** to move to the next page.

## Settings Wizard: Articulation Limits (2455)

The screenshot shows a dialog box titled "Settings Wizard: Articulation Limits". It contains the following text: "AutoTrack models the behaviour of vehicles as accurately as possible. It incorporates no safety factors or margins of any kind." and "Articulation angles are currently not limited. You may enable as many or as few of the following limits as you wish." There are two checkboxes: "Limit articulation to percent" with a value of 80 % and "Limit articulation to angle" with a value of 45 deg. At the bottom, there is a button labeled "Advanced..." and a row of navigation buttons: "< Back", "Next >", "Finish", "Cancel", and "Help".

### Settings Wizard: Articulation Limits

1. You can limit the articulation angles in two ways mutually inclusive ways, i.e. you can switch them all on and AutoTrack will determine the most onerous case and use that.
2. Tick **Limit articulation to percentage** and edit the value to prevent the articulation angles from exceeding the stated percentage of their maximum capability.

#### Note

*This is the only way to limit the articulation angles in a vehicle independent way.*

3. Tick **Limit articulation to angle** and edit the value to prevent the articulation angles exceeding a specified angle (in either direction).
4. Click the **Advanced** button to set these values in the Model Settings dialog (see [Drawing Settings: Paths: Model \(Roads & Airports\)](#)).
5. Click **Next** to move to the next page.

## Settings Wizard: Dynamics <sup>(2460)</sup>

Settings Wizard: Dynamics

Your current design speed is high enough to cause discomfort to the occupants of a vehicle if it turns at it's geometric minimum radius.

Under these circumstances we recommend that you limit the turn radius based upon the road design and vehicle speed:-

☒ Limit turning for dynamic effects

Use recommendations from: AASHTO Handbook 2004

Design context: Low speed urban streets (Exhibit 3-16)(M)

Click: Next to continue

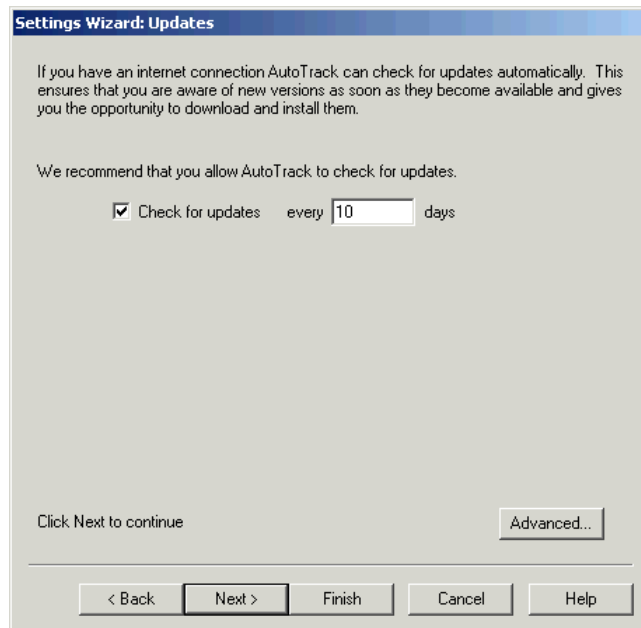
Advanced...

< Back   Next >   Finish   Cancel   Help

### Settings Wizard: Dynamics

1. If you are modelling turns at faster than about 15kph dynamic effects become significant. When you make a turn at higher speed the limiting criteria may be driver comfort rather than vehicle geometry. We recommend that you tick **Limit turning for dynamic effects** when modelling higher speed turns.
2. The wizard only allows you to select from published criiteria, if you want to define your own criteria click the **Advanced** button and do so on the advanced **Dynamics** settings dialog.
3. Click **Next** to move to the next page.

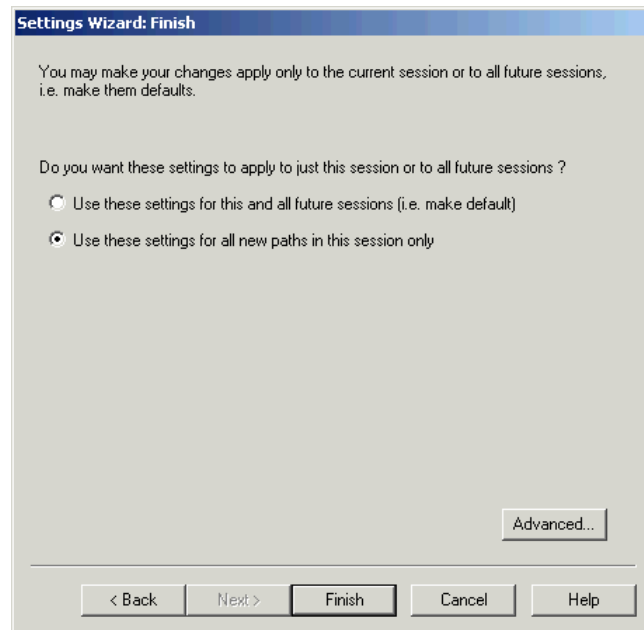
## Settings Wizard: Updates (2470)



### Settings Wizard: Updates

1. If you have an internet connection AutoTrack can check for updates for you. Tick **Check for updates** to enable this feature and enter the frequency of checking. If you enter zero AutoTrack will check for updates every time it is run.
2. Click **Next** to move to the next page.

## Settings Wizard: Finish <sup>(2480)</sup>



### Settings Wizard: Finish

1. If you don't want to have to keep changing these settings every time you run AutoTrack then select **Use these settings for this and all future sessions**. Otherwise, select **Use these settings for all new paths in this session only**.
2. Click **Finish** to confirm your selection.

---

# Report Wizard

The Report Wizard is design to help you to setup your AutoTrack reports correctly. It can actually be used to create or edit either your default reports or reports associated with existing paths.

The wizard does not allow you to edit all settings but on every page there is an **Advanced** button that takes you to the Reports tabbed dialog.

Also on every page is a **Finish** button. This applies any changes made so far for the current session only. If you want to make the changes apply to future sessions you should click **Next** until you get to the Finish page.

1. Select **Report Wizard** from the AutoTrack drop down menu or click the **Report Wizard** button on the AutoTrack toolbar or type `ATRAREPORTWIZARD` on the command line. The Report Wizard will appear.



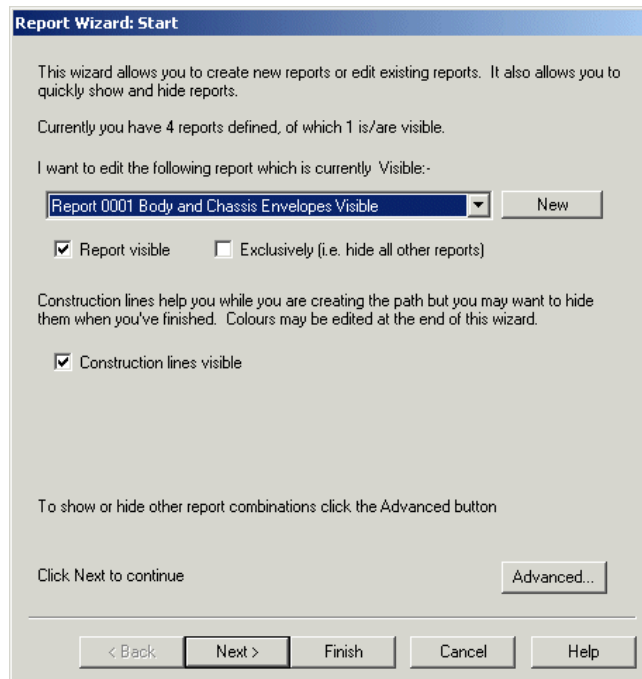
*Report Wizard button*

The 'Report Wizard: Start' dialog box. It has a title bar 'Report Wizard: Start'. The main text says: 'This wizard allows you to create new reports or edit existing reports. It also allows you to quickly show and hide reports. Currently you have 4 reports defined, of which 1 is/are visible. I want to edit the following report which is currently Visible:-'. Below this is a dropdown menu showing 'Report 0001 Body and Chassis Envelopes Visible' and a 'New' button. There are two checkboxes: 'Report visible' (checked) and 'Exclusively (i.e. hide all other reports)' (unchecked). Below this is another text block: 'Construction lines help you while you are creating the path but you may want to hide them when you've finished. Colours may be edited at the end of this wizard.' with a checkbox 'Construction lines visible' (checked). At the bottom, it says 'To show or hide other report combinations click the Advanced button' and 'Click Next to continue'. There is an 'Advanced...' button. At the very bottom are five buttons: '< Back', 'Next >', 'Finish', 'Cancel', and 'Help'.

Report Wizard: Start

2. Click the **Advanced** button to go directly to the [Drawing Settings: Paths: Reports](#) dialog.
3. Click **Next** to move to the next page.

## Report Wizard: Start <sup>(3700)</sup>



Report Wizard: Start

1. The wizard only allows you to edit one report at a time. If you have more than one report defined they will be listed in a drop down list box and you must select which report you want to change.
2. The current visibility is displayed under the drop down list.

If the report is not currently visible:-

Tick **Report visible** to make the report visible. If you want to hide all the other reports then tick **Exclusively**. This is the quickest way to switch between reports.

If the report is currently visible:-

Untick **Report visible** to hide the report. This will not affect any other reports listed so you may then want to select another report to show.

3. Click the **New** button to add a report to the list. The new report will be selected and you should then use the wizard to set it up as you require.
4. When you have finished your manoeuvre you may want to untick **Construction lines** to reduce the clutter. If you want to change which construction lines are displayed or their colour, either continue through the wizard to the relevant page or click the **Advanced** button and use the [Drawing Settings: Paths: Reports](#) dialog.
5. By default construction lines are not plotted but if you wish to see construction lines on plotted output then tick **Plot construction lines**.
6. If you want to enable other combinations of reports click the **Advanced** button.

7. Click **Next** to move to the next page.



## Report Wizard: Graphical sub-reports <sup>(3710)</sup>

7.

Report Wizard: Body Outlines  
(other graphical sub-reports are similar)

1. Select where you want this element using the tick boxes.
2. All pages except Body Outlines have a further option, **At all body positions**, to display them at all positions at which a body outline is drawn.
3. The attributes buttons on the right show the line colour and style. Click on the button to change these in the [Report Attributes dialog](#) <sup>(3820)</sup>.
4. If the page has an envelope option and you want to set the hatch spacing or angle or if you want to define an offset envelope click the **Advanced** button.
5. Click **Next** to move to the next page.

## Report Wizard: Path Annotation <sup>(3790)</sup>

8.

**Report Wizard: Path Annotation [Report 0001 Body and Chassis Envelopes]**

This report allows you to annotate the path with the vehicle name at discrete positions and/or the path number at regular intervals. If you want to change the text click the Advanced button.

☒ I want to display Annotation as follows:-

☒ At the following discrete positions

☒ At the start of the path ☐ At all discrete body positions

☐ At the end of the path

☐ At model changes (e.g. changes of speed)

☐ At changes of direction Forward Reverse

☐ At all target points [ ] [ ]

☐ At spacing of 50 m [ ] [ ]

Click Next to continue Advanced...

< Back
Next >
Finish
Cancel
Help

### Report Wizard: Path Annotation

1. Select where you want this element using the tick boxes.
2. The vehicle name is displayed at all discrete locations selected and the the path number is displayed at a regular spacing if selected.
3. The attributes buttons on the right show the line colour and style. Click on the button to change these in the [Report Attributes dialog <sup>\(3820\)</sup>](#).
4. If you want to set display something other than the vehicle name or the path number click the **Advanced** button.
5. Click **Next** to move to the next page.

## Report Wizard: Profile <sup>(3805)</sup>

Report Wizard: Profile [Report 0001 Body and Chassis Envelopes]

A side or plan view of the vehicle which can optionally be dimensioned.

☒ I want to display a diagram as follows:-

☐ Show plan view of vehicle

☒ Offset from start of path    X     Y

☒ Show dimensions and vehicle details

Dimensions font height  Units

Vehicle details font height  Units

Click Next to continue   

### Report Wizard: Profile

1. Select the elements you wish to see by ticking the appropriate boxes.
2. By default a side view of the vehicle is displayed, if you would rather a plan view then tick **Show plan view of vehicle**.
3. The edit fields let you adjust the position of the diagram and the font size.
4. The attributes buttons on the right show the line colour and style. Click on the button to change these in the [Attributes dialog](#) <sup>(3830)</sup>.
5. To change other aspects of the steering graph click the **Advanced** button.
6. Click **Next** to move to the next page.

## Report Wizard: Steering & Articulation Graph (3795)

Report Wizard: Steering & Articulation Graph [Report 0001 Body and Chassis E...]

A graph showing how the steering and articulation angles change along a path can often highlight potential problems.

☒ I want to display a steering & articulation angles graph as follows:-

<input checked="" type="checkbox"/> Show grid lines		[Color/Style Button]
<input checked="" type="checkbox"/> Show axes	<input checked="" type="checkbox"/> Show origin	[Color/Style Button]
<input checked="" type="checkbox"/> Show bounding box	<input checked="" type="checkbox"/> Show leader line	[Color/Style Button]
<input checked="" type="checkbox"/> Show steering	<input checked="" type="checkbox"/> Show max angle	[Color/Style Button]
<input checked="" type="checkbox"/> Show secondary steering	<input checked="" type="checkbox"/> Show max angle	[Color/Style Button]
<input checked="" type="checkbox"/> Show linked steering		[Color/Style Button]
<input checked="" type="checkbox"/> Show articulation	<input checked="" type="checkbox"/> Show max angle	[Color/Style Button]
<input checked="" type="checkbox"/> Show section lines	<input checked="" type="checkbox"/> Show speed	[Color/Style Button]
<input checked="" type="checkbox"/> Show discrete bodies	<input type="checkbox"/> Show leader line	[Color/Style Button]
<input checked="" type="checkbox"/> Label peaks	<input checked="" type="checkbox"/> Show % of max angles	

Click Next to continue

Advanced...

< Back   Next >   Finish   Cancel   Help

### Report Wizard: Steering & Articulation Graph

1. Select the elements you wish to see by ticking the appropriate boxes.
2. The attributes buttons on the right show the line colour and style. Click on the button to change these in the [Attributes dialog](#) <sup>(3830)</sup>.
3. To change other aspects of the steering graph click the **Advanced** button.
4. Click **Next** to move to the next page.

## Report Wizard: Construction Lines <sup>(3800)</sup>

Report Wizard: Construction Lines [All reports]

Construction lines are often useful while designing a scheme but tend to clutter the final presentation.

☒ I want to display the following construction lines

	Forward	Reverse
<input checked="" type="checkbox"/> Path	<input type="text"/>	<input type="text"/>
<input checked="" type="checkbox"/> Errored Path	<input type="text"/>	<input type="text"/>
<input checked="" type="checkbox"/> Model Changes	<input type="text"/>	<input type="text"/>
<input checked="" type="checkbox"/> Target Points	<input type="text"/>	<input type="text"/>
<input checked="" type="checkbox"/> Drag Lines	<input type="text"/>	<input type="text"/>
<input checked="" type="checkbox"/> Steering Pointer	<input type="text"/>	<input type="text"/>

Click Next to continue Advanced...

< Back **Next >** Finish Cancel Help

### Report Wizard: Construction Lines

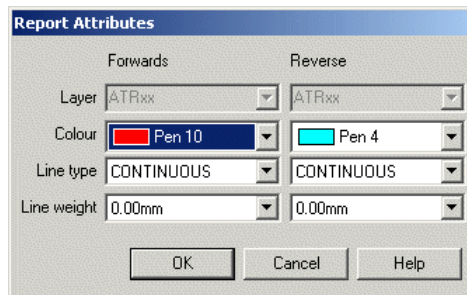
1. Tick the construction line that you want to see.

#### Note

*Construction lines tend to clutter the finished drawing so we normally suggest that you switch them off.*

2. The attributes buttons on the right show the line colour and style. Click on the button to change these in the [Report Attributes dialog](#) <sup>(3820)</sup>.
3. To switch off all construction lines untick **I want to display the following construction lines**.
4. Click **Next** to move to the Finish page.

## Report Attributes dialog <sup>(3820)</sup>



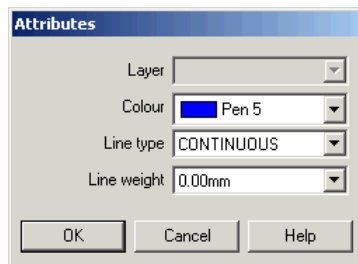
Report Attributes dialog

1. Select the **Colour** from the drop down list of 254 pens. To set a custom colour select {custom} and click on the colour swatch.
2. Select the **Line type** from the drop down list. The line types listed are those currently available in your CAD system. If you wish to add a line type you should cancel this dialog and create the line type in your host CAD system.
3. Select the **Line weight** from the drop down list.

### Note

*Line weights are real world dimensions so if you select a line weight of 2mm the object will be drawn with 2mm thick lines.*

## Attributes dialog <sup>(3830)</sup>



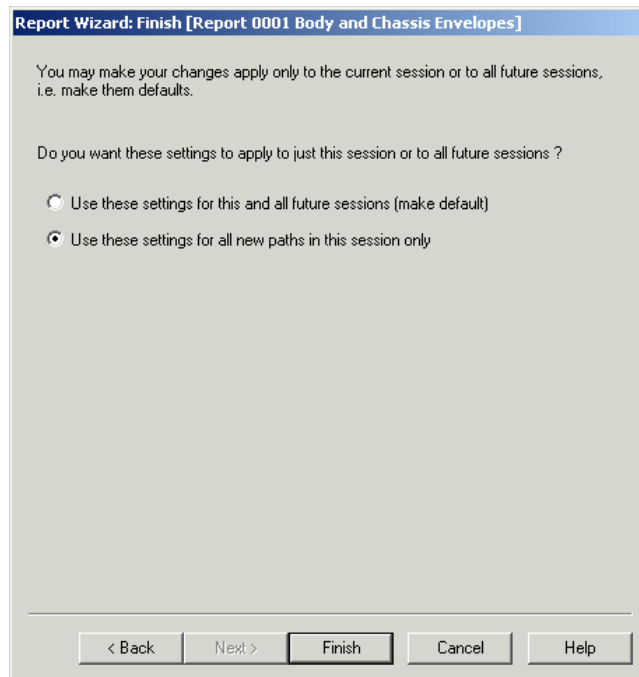
Attributes dialog

1. Select the **Colour** from the drop down list of 254 pens. To set a custom colour select {custom} and click on the colour swatch.
2. Select the **Line type** from the drop down list. The line types listed are those currently available in your CAD system. If you wish to add a line type you should cancel this dialog and create the line type in your host CAD system.
3. Select the **Line weight** from the drop down list.

### Note

*Line weights are real world dimensions so if you select a line weight of 2mm the object will be drawn with 2mm thick lines.*

## Report Wizard: Finish (3810)



### Report Wizard: Finish

1. If you don't want to have to keep changing these settings every time you run AutoTrack then select **Use these settings for this and all future sessions**. Otherwise, select **Use these settings for all new paths in this session only**.
2. If you have a path selected then a third option will be displayed, **Use these settings for the selected path only**. This allows you to quickly change the report properties for the selected path.
3. Click **Finish** to confirm your selection.

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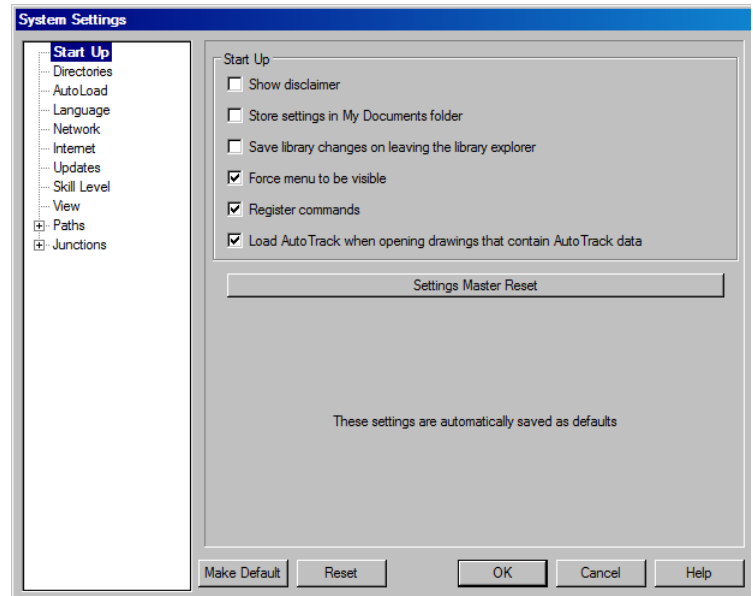
# System Settings

The AutoTrack System Settings control the default behaviour of AutoTrack in all drawings on the CAD system. The settings are displayed all at once on a single tabbed dialog.

1. Select System Settings from the AutoTrack drop down menu or click the **System Settings** button on the AutoTrack toolbar or type `ATRASYSTEMSETTINGS` at the command line. The System Settings dialog will appear.



*System Settings button*



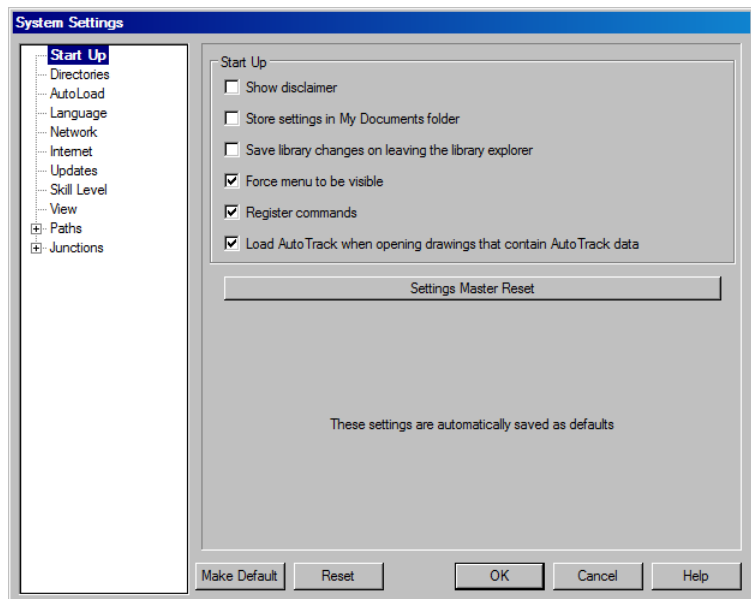
System Settings dialog

2. Click the appropriate tab to edit or view the settings.
3. Edit the data as required and click **OK** to confirm when you are satisfied. Click **Cancel** to abort all changes and close the System Settings dialog.
4. Click **Make Default** to save the displayed settings as defaults for the next session. Click **Reset** to restore your last saved default settings following changes.



## System Settings: Start Up (2000)

1. Click on the **Start-Up** tab.



System Settings dialog: Start Up tab

2. Tick **Show disclaimer** to display the disclaimer at the start of each session.
3. By default all settings are stored in the Settings subdirectory of the application data directory. This means that changes made by one user affect all others. To instead store the program settings in each users My Documents data folder, tick **Store settings in "My Documents" folder**.

### Note

*Your computer may still be configured so that the My Documents folder is a common area.*

4. Should you wish to apply common settings for all users but wish to disallow write access to the application tree you can edit the file SAVOY.INI in the AutoTrack installation directory. Open the file in a text editor and find the line [SETTINGS]. If this line does not exist add it at the bottom of the file. Then add or edit the line ApplicationDataDir={Application Data Directory} to point to the required directory (see [Some points to note](#) for more details).
5. Tick **Save library changes on leaving library explorer** if you want AutoTrack to automatically update the library files with any changes when you leave the library explorer. If you do not tick this box you will be asked if you want to update the library file every time you close the library explorer.
6. The following three checkboxes will be disabled if your CAD system does not support the option.
7. Tick **Force menu to be visible** to load the AutoTrack menu at start-up. If you do not check this box, and the AutoTrack menu is unloaded, you will need to load AutoTrack (which includes the menus) manually by typing AUTOTRACK (or ATRACK) on the command line.

8. Tick **Register commands** to ensure that AutoTrack commands are recognised by your CAD system. We strongly recommend that you leave this box ticked. If this box is not ticked you will need to load the AutoTrack executable manually using the Load Application command in AutoCAD (see [Configuring AutoCAD manually](#)).
9. By default AutoTrack is initialised if you load a drawing that contains AutoTrack entities. If you do not want this to happen untick **Load AutoTrack when opening drawings that contain AutoTrack data**. This option only applies to AutoCAD versions.

**Note**

*On AutoCAD 2010 or later the ARX will not load but the DBX object enabler will always load.*

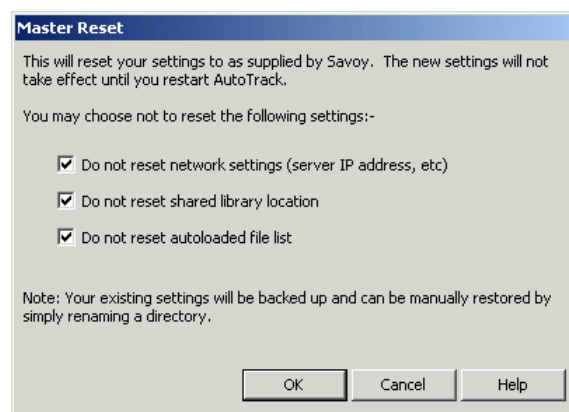
10. The **Settings Master Reset** button allows you to reset all the settings (including reports) for all versions of AutoTrack to the AutoTrack built-in defaults. It will display the Master Reset dialog (see [Master Reset dialog](#) <sup>(2310)</sup>) which allows you to confirm and override selected settings. The existing settings directory is renamed with a date and time stamp. If you need to restore previous settings then simply replace the Settings directory with the appropriate archived directory.

**Note**

*The new settings only take effect when the software is restarted.*

### **Master Reset dialog** <sup>(2310)</sup>

1. The Master Reset dialog appears when you invoke a Master Reset and allows you to prevent certain key settings from being reset.

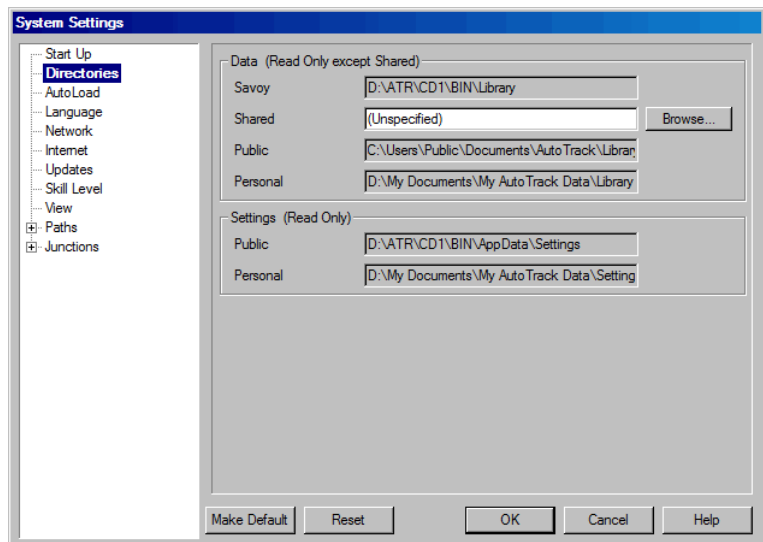


Master Reset dialog

2. Tick those items that you do not want reset. Options are network settings, shared data location (if defined) and the autoloaded data list. If you wish to reset any or all of these settings then you should untick the relevant check boxes.
3. When you restart AutoTrack following a Master Reset the [Welcome dialog](#) <sup>(1700)</sup> will be displayed.

## System Settings: Directories (2200)

1. Click on the **Directories** tab.



System Settings dialog: Directories tab

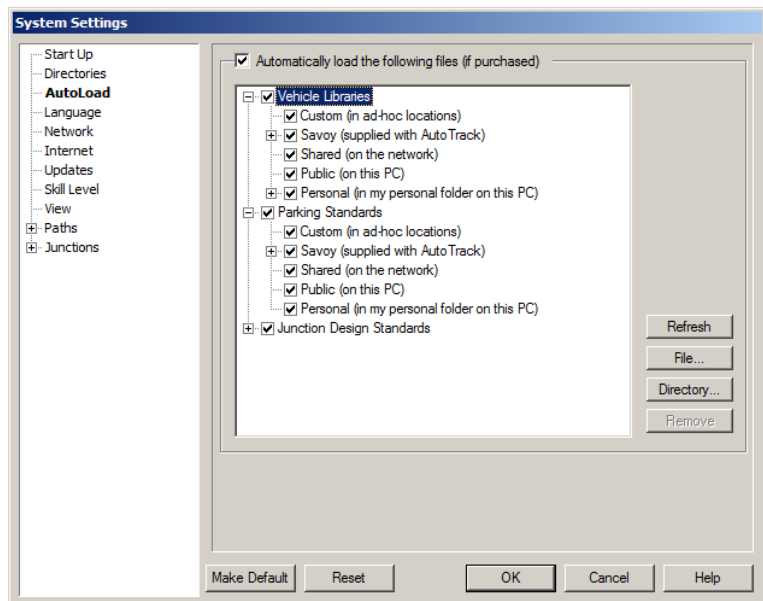
2. The various incarnations of Windows each store data in slightly different locations. This dialog tells you where the various program and data directories are on your version of Windows.
3. The **Savoy** data directory is used for data used by AutoTrack which is not editable by the end-user.
4. The **Public** data directory is used for data shared between users on this computer.
5. The **Personal** data directory is used for data created by individuals. This is the default location for most new data and it is for the user to share it as required. We suggest that good practice would be to create and verify new data in personal area and share it only when it has been checked.
6. The only editable field is the **Shared** data directory. This is the directory used to share data within your organization or department and to be effective must be chosen with care and use consistently on all computers.
7. The Public settings directory is used for all settings files unless the user has opted to save their settings in their Personal area by ticking **Store settings in My Documents folder** on the Startup settings tab.
8. The Personal settings directory is where settings data is stored if the user has ticked **Store settings in My Documents folder** on the Startup settings tab.

### Note

*Your computer may still be configured so that the My Documents folder is a common area.*

## System Settings: AutoLoad (2005)

1. Click on the **AutoLoad** tab.



System Settings dialog: AutoLoad tab

2. The AutoLoad settings let you control which data is automatically loaded when the Vehicle Library Explorer or Parking Standard Explorer is opened.
3. All AutoTrack data files found in all the data directories listed on the Directories settings tab are listed in a hierarchical tree and all are ticked (i.e. selected for opening) by default. The list is updated every time AutoTrack is run and new files found are added and ticked.
4. To prevent data from being loaded automatically simply untick the box alongside the item. If you untick a branch that has 'children' you do not need to untick all the 'children' too. For example, to prevent all **Savoy** vehicle libraries from being loaded you only need to untick Savoy and not all the individual library files.
5. If you would rather load all vehicle libraries manually as and when you need them then untick **Vehicle Libraries** and if you would rather load all data of all types manually then untick **Automatically load the following files**.
6. You may customise the list of files that AutoTrack auto-loads by adding individual files or directories. These are added to the Custom data location list.

### Note

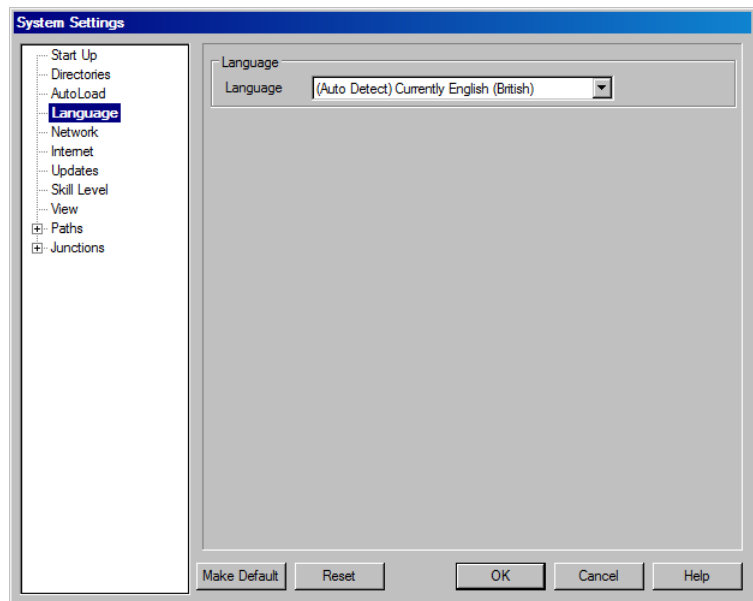
*AutoTrack only auto loads libraries or standards that you are authorised to use, i.e. that you have purchased.*

7. Click the **File** button and browse to find the required library or standard. Click **Open** when you find the file and it will be added to the list.
8. Click the **Directory** button and browse to find the required directory. Click **OK** when you find the directory and it will be added to the list.

9. Click the **Remove** button to remove entries (individual libraries or complete directories) from the list.
10. Click the **Refresh** button to rebuild the list without leaving AutoTrack.

## System Settings: Language <sup>(2010)</sup>

1. Click on the **Language** tab.

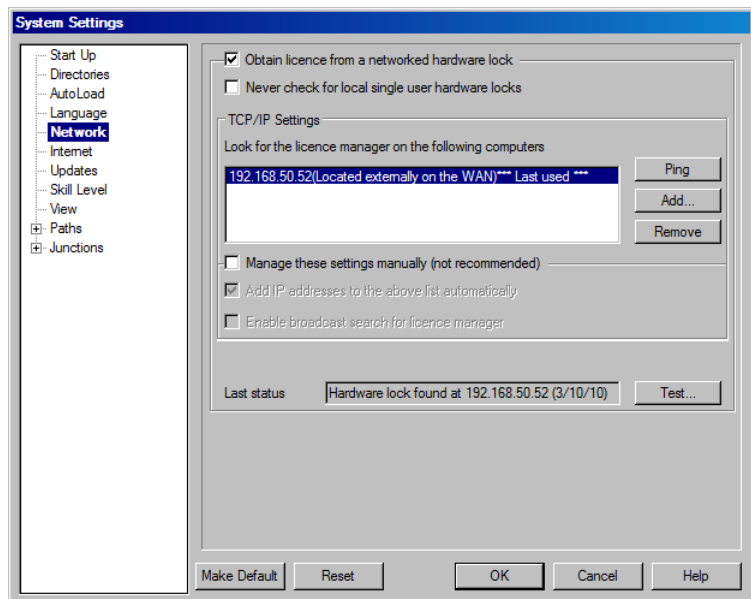


System Settings dialog: Language tab

2. By default AutoTrack detects the input locale setting on your computer and uses this to determine the language to use.
3. However, if you want to force AutoTrack to use a particular language then select it from the drop down list. The menus and dialogs will change as soon as you click **OK**.
4. Currently the languages are English (British), English (American), French, German, Spanish, Italian and Portuguese.
5. If the language is wrong when set to (AutoDetect) you may have your Input locale set wrongly in Windows Control Panel, Regional Settings.

## System Settings: Network <sup>(2015)</sup>

1. Click on the **Network** tab.



System Settings dialog: Network tab

2. Tick **Obtain licence from a networked hardware lock** if you want AutoTrack to look for a free network licence.
3. AutoTrack will always look for a local hardware lock (i.e. a single user lock) first and use that if one exists. If you want to disable this feature then tick **never check for single user hardware locks plugged into this computer**.
4. By default AutoTrack will search for available licences on your subnet. If it finds one it will use it and add the IP address to the search list. Next time you start AutoTrack it will look for a licence first on the computer that it found the licence last time. If it fails to find a free licence it will re-search your subnet. Again, if it finds one on another computer it will add its IP address to the search list. We recommend that you use this default functionality. If you want to add an IP address to the search list manually click the **Add** button and enter the address. To delete an IP address from the list highlight it and click **Remove**.

### Note

*The network version is licenced for use only on local area networks, i.e. all copies must be on the same subnet..*

5. If you wish to change the default functionality tick **Manage these settings manually**.
6. If you want AutoTrack to add new IP addresses to the search list tick **Add IP addresses to the above list automatically**. In most cases this option will enable AutoTrack to find a network licence faster.
7. If you want AutoTrack to search the subnet for a licence if it fails to find a licence at one of the specified IP addresses then tick **Enable broadcast search for licence manager**. We strongly recommend that you leave this option ticked.

**Warning**

*If you manage the settings manually and untick both **Add IP addresses to the above list automatically** and **Enable broadcast search for licence manager** and if there are no IP addresses in the search list or if they are wrong AutoTrack will never find a licence.*

8. Click **Test Settings** to check that the settings can find a licence. **Last status** displays the results of the last search for a network licence.

**Releasing network licences**

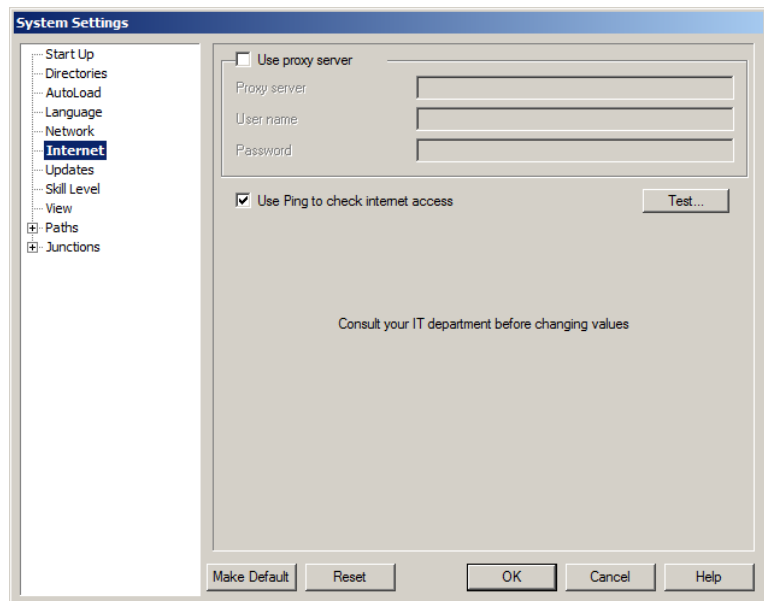
Occasionally you may need to release a network licence to allow someone else to use AutoTrack on another computer.

1. To release a network licence either select **Release network licence** from the AutoTrack, Utilities drop down menu or select **About AutoTrack** from the AutoTrack, Help drop down menu and click the Release button.



## System Settings: Internet (2210)

1. Click on the **Internet** tab.



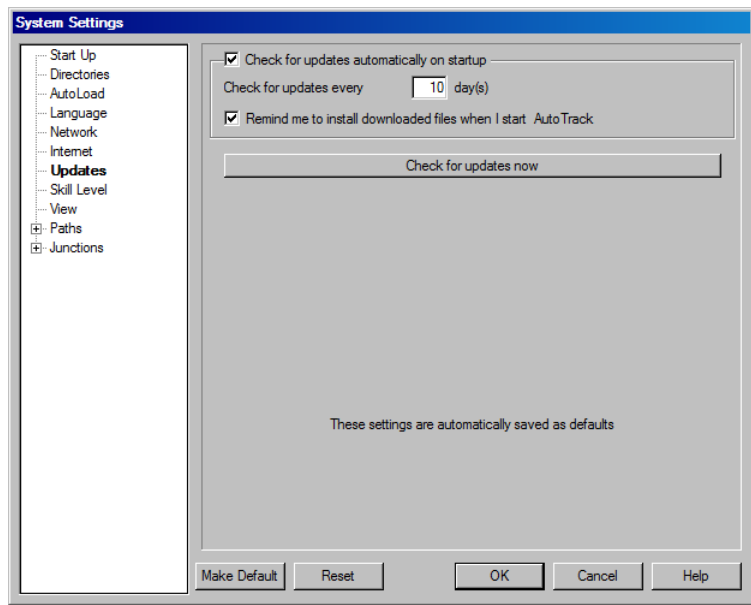
System Settings dialog: Internet tab

2. If you use a proxy server then tick **Use proxy server** and enter the details here. We recommend that you consult your IT department before changing these values.
3. By default Ping is used to test for the internet. If this causes problems on your system untick **Use Ping to check internet access**.
4. Click the **Test** button to check that the settings work.

## System Settings: Updates <sup>(2190)</sup>

AutoTrack is able to log onto the internet and check for newer versions of itself automatically at regular intervals dictated by the user. By default this feature is switched off but the user is offered the opportunity to switch it on when the first automatic check is due. Update checking may have been restricted by your system administrator.

1. Click on the **Updates** tab.



System Settings dialog: Updates tab

2. Click the **Check for updates now** button to access the internet and check for updates immediately. If an update is available the AutoTrack Updates dialog will appear. See [AutoTrack Updates dialog](#) below.
3. Tick **Check for updates automatically on startup** to have AutoTrack check for newer versions at regular intervals when AutoTrack is started. Note that the check is performed when AutoTrack starts and not when the CAD system starts.
4. Enter the frequency of checking in days in the **Check for updates every** field. If you want AutoTrack to check for updates every time you run the program set the frequency to zero.
5. Tick **Remind me to install downloaded files when I start AutoTrack** to be reminded, every time you start AutoTrack, if you have downloaded a newer version but not yet installed it.

### Note 1

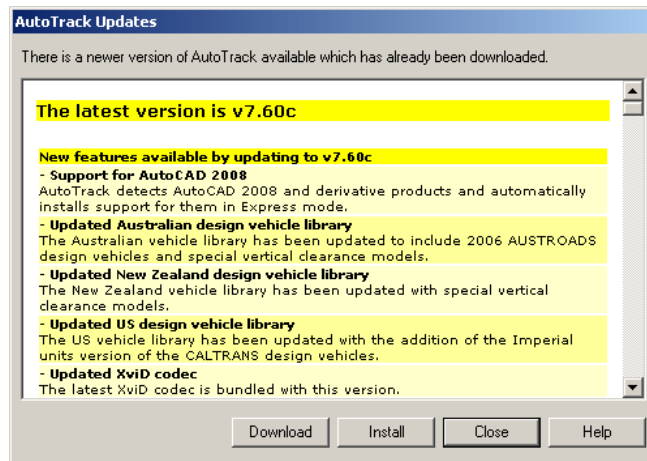
*If the **Check for updates automatically on startup** tick box is disabled automatic update checking may have been disabled by your system administrator.*

### Note 2

*If the **Check for updates now** button is disabled all update checking may have been disabled by your system administrator.*

## AutoTrack Updates dialog <sup>(1970)</sup>

1. The AutoTrack Updates dialog lists the main changes to AutoTrack since the version you are currently running.



AutoTrack Updates dialog

2. Click the **Download** button to download the file to the My AutoTrack Data\Updates subdirectory of your My Documents folder.

### Note

*While the file is downloading you will be unable to use other functions in your CAD system. Users with slow connections may therefore prefer to logon to the web site at a more convenient time.*

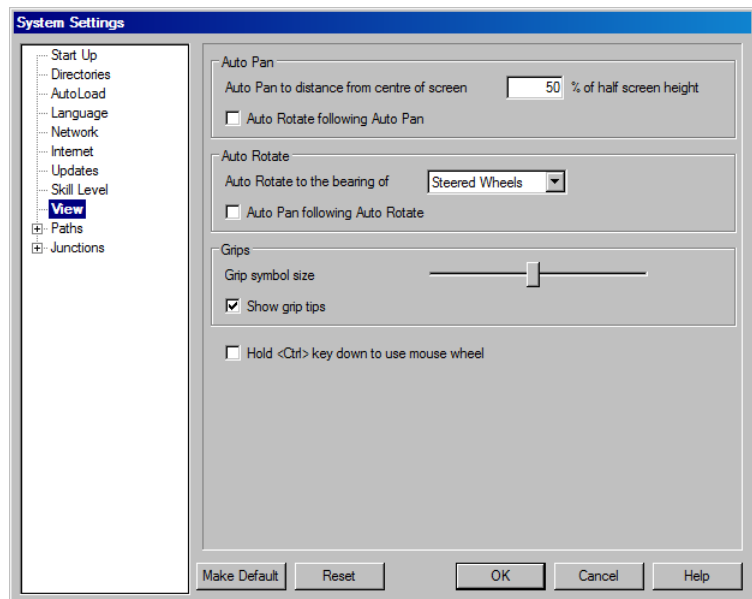
### Warning

*If your company has a policy of central software control then you may have restricted access. This means that you will not be able to download the software but instead should refer to your system supervisor.*

3. As soon as the download has finished, or if you have previously downloaded the new version but not yet installed it, the **Install** button will be enabled. Click the **Install** button to install the new version. The current session will be closed while the new version is installed.
4. Tick **Don't remind me again** (only visible when checking was automatic) and click the **Close** button if you don't want to be reminded of updates in future, i.e. to switch off automatic update checking.

## System Settings: View <sup>(2040)</sup>

1. Click on the **View** tab.



System Settings dialog: View tab

2. By default **AutoPan** moves the drawing so that the vehicle wheels are pointing directly at the centre of the screen and are positioned a distance of 50% of half the screen height from the centre of the screen. This allows you space to continue the manoeuvre. You can set the distance from the centre of the screen at which the vehicle is positioned following the pan by changing **AutoPan to Distance from Centre of Screen**. Set a value of 0% if you want the vehicle positioned exactly in the centre of the screen following the pan. Set 100% if you want the vehicle positioned right on the edge of the screen following the pan but be warned that in this case most of the vehicle is likely to not be visible following the AutoPan.
3. Tick **AutoRotate following AutoPan** if you want the drawing rotated at the same time as it is automatically panned. This does not affect behaviour if you manually invoke the pan command.
4. **AutoRotate** rotates the drawing so that either the spine of the tractor unit points directly up the screen. We find that this makes visualising the vehicles orientation easier when using the Manual Drive interface. However you can set **AutoRotate to Bearing of** to Steered Wheels if you find that more natural.
5. Tick **AutoPan following AutoRotate** if you also want to pan the drawing when AutoRotate is invoked.
6. Use the **Grip symbol size** slider to adjust the size of the editing grips.
7. Tick **Show grip tips** to display a text prompt alongside each grip when the cursor is over the grip.

### Note

*The **Grip symbol size** and **Show grip tips** settings only apply to grips displayed when using the AutoTrack editing commands.*

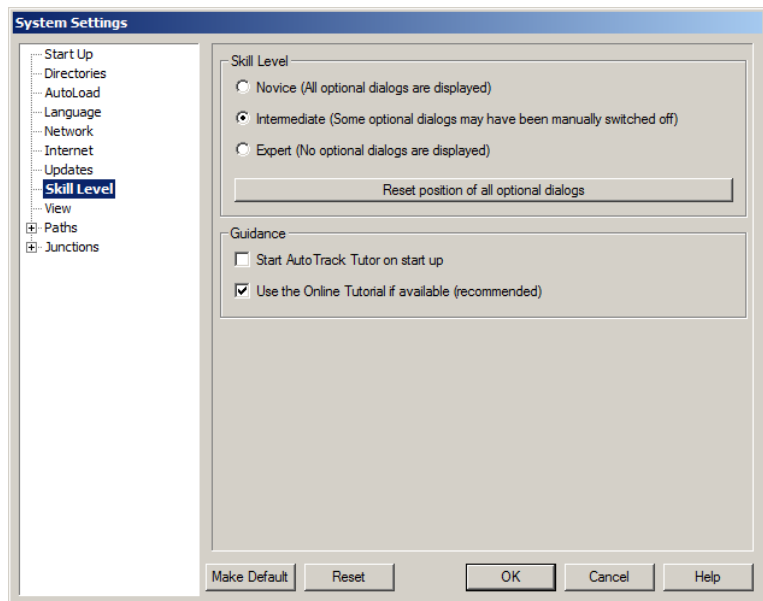
*Grips displayed when the object is simply selected are controlled by the host CAD system settings.*

8. Some AutoTrack features, such as manually controlled secondary steering, make use of the mouse wheel. By default in these cases we temporarily override any CAD functions that use the mouse wheel and to use the CAD function you must hold the **<Ctrl>** key down.

If you would rather that the CAD system had priority tick **Hold <Ctrl> key down to use mouse wheel**. The CAD system will then retain control of the mouse wheel unless you hold down the **<Ctrl>** key.

## System Settings: Skill Level (2050)

1. Click on the **Skill Level** tab.

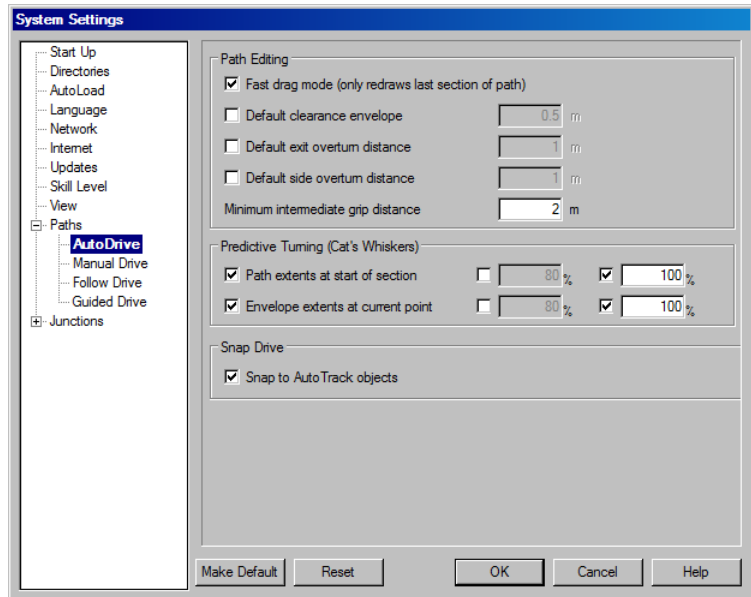


System Settings dialog: Skill Level tab

2. Check the option appropriate to your knowledge and experience of AutoTrack. **Novice** users are presented with dialog boxes and prompts in addition to the command line prompt. **Expert** users only get command line prompts with no additional dialogs. Although you can select **Intermediate** skill level, it has no direct effect; it is normally selected automatically if, as a novice user, you disable one or more of the optional dialog boxes by ticking the **Do not show this dialog again** box.
3. To re-enable all optional dialog boxes disabled by an Intermediate user simply select the **Novice** skill level.
4. AutoTrack will remember the last location of all optional dialogs for the current CAD session. Click the **Reset position of all optional dialogs** button to reset the position all dialogs to the centre of the screen.
5. The AutoTrack Tutor provides dynamic help as you navigate through the program. We recommend that new users leave **Start AutoTrack Tutor on startup** ticked until they are familiar with the program.
6. A static video tutorial is provided with the program but we recommend that you access the online version if possible by ticking **Use Online Tutorial if available**.

## System Settings: Paths: AutoDrive (Roads only) (2100)

1. Click on the **AutoDrive** tab.



System Settings dialog: AutoDrive tab

2. Tick **Fast drag mode** to only redraw the current point and one either side during dynamic editing. When the new point is confirmed the whole path is recalculated and redrawn. If this box is not checked the dynamic editing will be slower but more accurate.
3. Tick **Default clearance envelope** to show a clearance zone outside the actual body envelope (if shown) and/or wheel envelope (if shown) while the vehicle is ghosted during driving. This allows accurate control if you have fixed clearance or safety guidelines. You may edit the clearance envelope offset distance in the adjacent box.
4. Tick **Default side overturn distance** to make the vehicle perform a side overturn by default (i.e. turn in the opposite direction prior to starting a bearing turn). Enter the default distance that the vehicle should deviate sideways.
5. Tick **Default exit overturn distance** to make the vehicle perform an exit overturn by default (i.e. turn past the normal exit point prior to turning back onto the required exit bearing). Enter the default distance that the vehicle should deviate from its normal path.
6. Enter the **Minimum distance between intermediate grips** to prevent too many closely spaced grips.
7. **Predictive Turning** mode draws path extents at the beginning of each section and envelope extents at the end of each section that help judge where to place target points. Note that the envelope extents for articulated vehicles represent not the absolute turning limits but the tightest turn possible without over-articulating. Thus it may be possible to turn tighter for a short distance.

8. Tick **Path extents at start of section** to show the left and right limits to path at the last target point placed. Select and enter up to two steering percentage values. Note that these are percentages of the lesser of the maximum non-articulating steering limits and the maximum steering angle.
9. Tick **Envelope extents at end of section** to show the left and right limits of the body envelope at the cursor. Select and enter up to two steering percentage values. Note that these are percentages of the lesser of the maximum non-articulating steering limits and the maximum steering angle.
10. Tick **Snap to AutoTrack objects** to have vehicles snap to valid routes through junctions and parking bays.

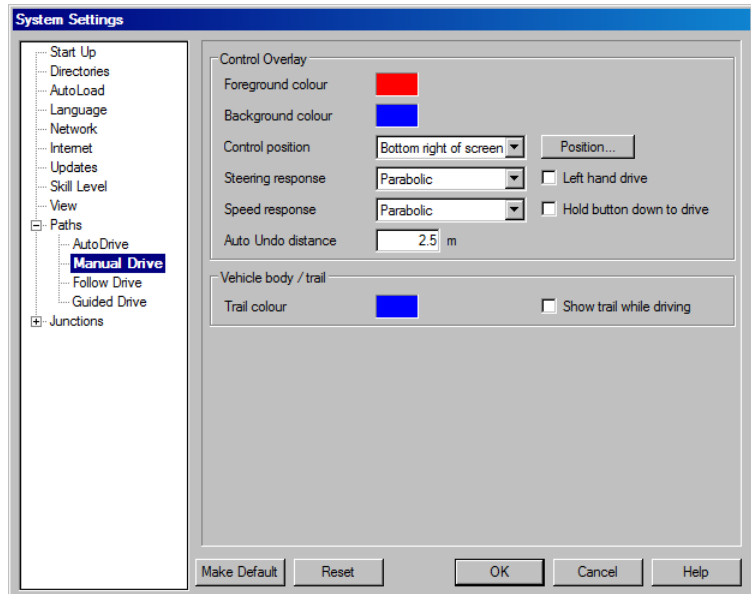
**Note**

*This mode can be overridden at drive time by holding <Ctrl> key down.*



## System Settings: Paths: Manual Drive (Roads only) <sup>(2110)</sup>

1. Click on the **Manual Drive** tab.



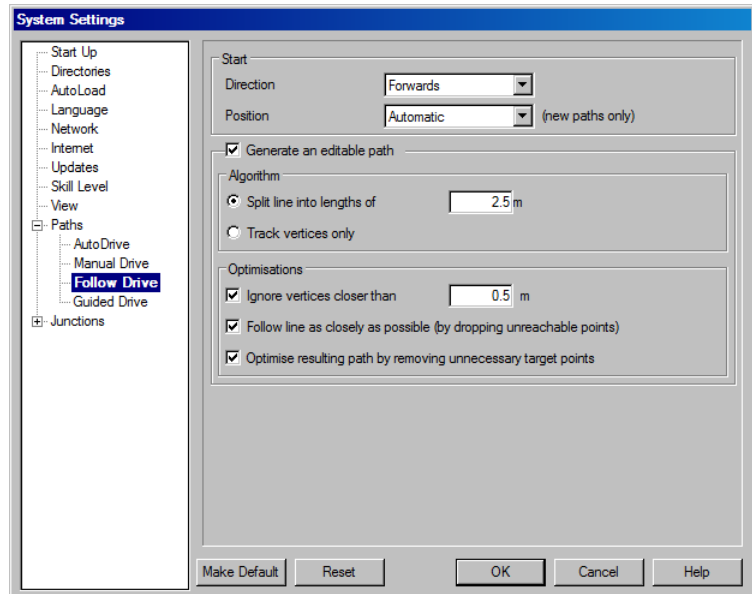
System Settings dialog: Manual Drive tab

2. Click on the **Foreground Colour** box to select your preferred colour for the lines on the control overlay.
3. Click on the **Background Colour** box to select your preferred colour for the background colour of the control overlay.
4. Select your preferred **Control Position** from the drop down list. If you wish to specify a non-standard location select Custom and click the **Position and Size** button to define.
5. Click the **Position and Size** button to adjust the default appearance of the control overlay. The control overlay will appear and should be adjusted for location and size just like a normal resizable window. When you are happy with the appearance click the **Stop** button to return to the System Settings dialog.
6. Select your preferred **Steering Response** from the list. By default the control is weighted to be more responsive at smaller angles. This response is based upon a parabolic curve. You may select a linear response if you find that more natural.
7. Select your preferred **Speed Response** from the list. By default the control is weighted to be more responsive at slower speeds. This response is based upon a parabolic curve. You may select a linear response if you find that more natural.
8. By default the left button is the pick and drive button and the right button toggles hands off as might be used by a right handed person. Tick **Left Hand Drive** if you prefer it the other way round.
9. If you tick **Hold Button Down to Drive** the vehicle will only move while you are holding the mouse button down. If you untick the box the vehicle will move as soon as the cursor moves outside the stop zone.

10. The **Auto Undo distance** is the length of path that is erased when you click the Auto Undo button on the control overlay. You may set it to any value but do bear in mind that auto undo is non-reversible and so we suggest that you do not set a very large value.
11. Tick **Show Outline Trails** to show a trail as you drive (a bit like a snail!).
12. Click on the **Vehicle Trail Colour** box to select your preferred colour for the trails left while driving.

## System Settings: Paths: Follow Drive (Roads only) <sup>(2120)</sup>

1. Click on the **Follow Drive** tab.



System Settings dialog: Follow Drive tab

2. The **Start Direction** is set by default to **Automatic** in which the direction of travel is based upon the orientation of the vehicle relative to the starting vertex of the polyline. Select **Forwards** or **Reverse** to if you want to force the direction of travel. Select **Keep Current** to continue in the current direction (e.g. if you often use Follow Drive after manoeuvres performed using a different drive mode).
3. Set the **Start Position** to **Automatic** to have the vehicle positioned at the end of the selected line closest to the point you picked with the steered wheels and all spines aligned tangentially to the line. If you want to adjust the vehicle orientation set Start Position to **Manual**. Start Position cannot be edited if the path is pre-selected, in these cases the current vehicle position and orientation is used.
4. By default Follow generates a non-editable path, i.e. you can move or rotate the entire path but not adjust the alignment. This gives best results in most cases. If you wish to create a path comprising a series of target points that can be dynamically edited then tick **Generate an Editable Path**.

### Note

*If you are checking fastest line then do NOT tick **Generate editable path**. (See also [Using Follow to check fastest line](#)).*

5. If you opt for the editable path you can choose between two line following algorithms:-  
Select **Split line into lengths** if you want AutoTrack to follow the line as closely as it can. You must supply a **segment length**, the shorter the distance the closer the vehicle will follow the line. The default distance of 2.5m should be suitable for most situations. You gain little from setting too close a distance and the program will run slower. Try increasing the segment length if

your vehicle cannot negotiate a turn.

Select **Track vertices only** if you want AutoTrack to use the vertices as target points. Note that this option will follow the automatically generated vertices on splined polylines.

6. Tick **Ignore vertices** to allow AutoTrack to ignore closely spaced vertices. Lines can be difficult to follow if they contain many closely spaced points so we recommend that this option is used.
7. The vehicle will not always be able to reach target points on tight bends. Tick **Follow line as closely as possible** to allow the vehicle to wander from the line temporarily instead of stopping. The vehicle will then ignore target points that it cannot reach and focus on the next one. This has the effect of allowing the vehicle to drift out on tight bends.
8. Not all automatically inserted target points will always be necessary, i.e. no change of steering may be required. If you tick **Optimise resulting path by removing unnecessary target points** AutoTrack will remove targets points at which no steering changes are required.

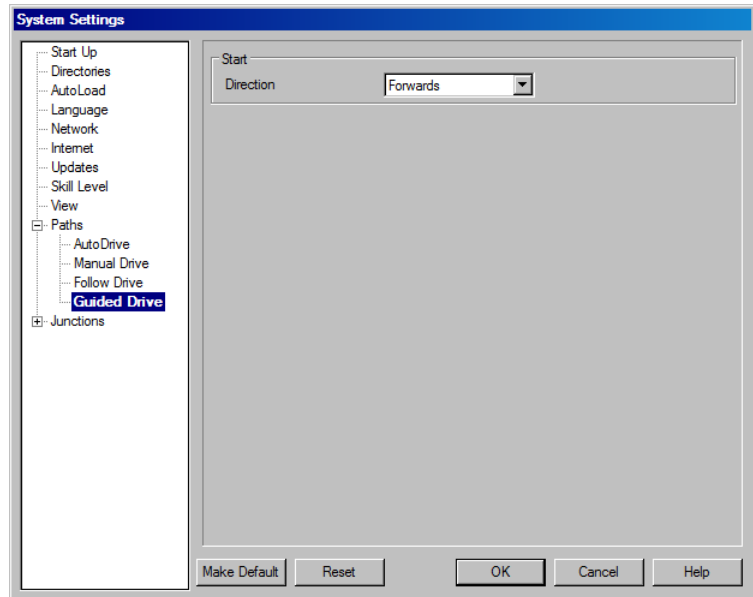
### ***Using Follow to check fastest line***

If you want to check fastest line (e.g. through a roundabout) then you should set the design speed to the highest permitted and then create a non-editable path, i.e. do NOT tick **Generate an editable path**.

If AutoTrack cannot complete the path at the specified design speed then the speed will be reduced to the point at which it can. Note that if the design speed has to be reduced it will be for the entire length of the path. If you wish to check individual bends within the paths you should split the path into sections.

## System Settings: Paths: Guided Drive (Rail only) (2130)

1. Click on the **Guided Drive** tab.

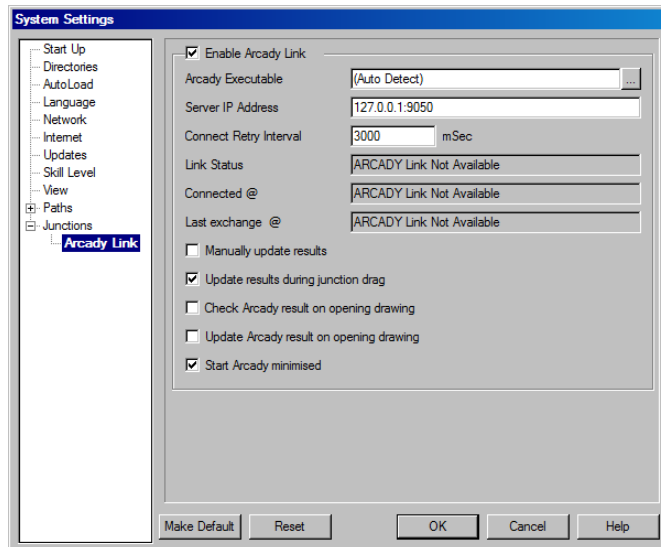


System Settings dialog: Guided Drive tab

2. The **Start Direction** is set by default to **Forwards**.

## System Settings: Junctions: Arcady Link (Junctions only) <sup>(2220)</sup>

1. Click on the **Arcady Link** tab.



System Settings dialog: Arcady Link tab

2. The **Arcady Executable** is the location of the Arcady program file. By default it is set to (Auto Detect) meaning that AutoTrack will look for the latest version of ARCADY on your computer. If ARCADY is installed on your computer and AutoTrack fails to find it, or you wish to force the use of a particular version, then you should enter the full path here. Use the browse button if possible to avoid typographical errors. If you subsequently need to revert to auto-detection then simply delete the path.
3. You should never need to change the **Server IP Address**. The current versions of AutoTrack and ARCADY communicate on port 9050.
4. If the connection fails then AutoTrack will attempt to reconnect after the **Connect Retry Interval**. By default it is set to 5sec.
5. The read only fields **Link Status**, **Connected** and **Last Exchange** provide some diagnostic information on the link once it has been established.
6. Tick **Manually update results** to pause the automatic transfer of data. In this mode any displayed ARCADY data will be out of date until you refresh the data by pressing the **Refresh** button.
7. Tick **Update results during junction drag** to see the ARCADY data change as the junction geometry is moved or adjusted.
8. Tick **Check Arcady result on opening drawing** to have AutoTrack validate (but not change) the stored Arcady data when opening a drawing that contains Arcady data.
9. Tick **Update Arcady result on opening drawing** to have AutoTrack validate and change the stored values if necessary when opening a drawing that contains Arcady data.
10. By default AutoTrack starts ARCADY minimized. If you would rather it started full screen then untick **Start Arcady minimised**.

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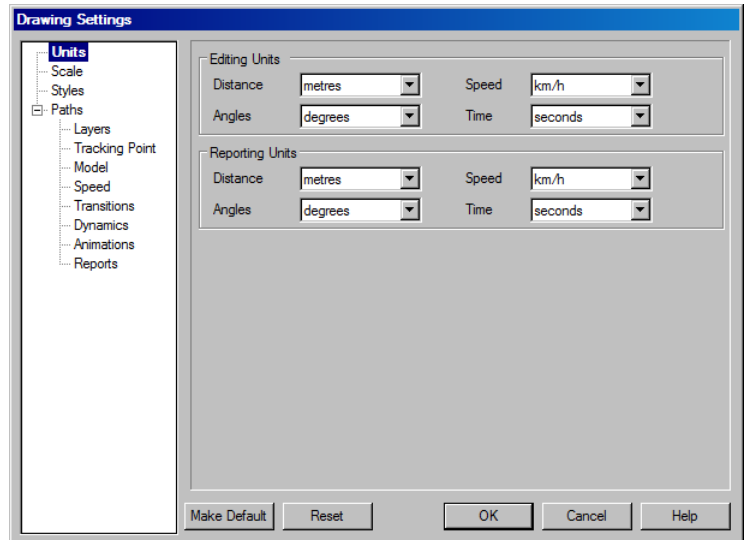
# Drawing Settings

The AutoTrack Drawing Settings control those aspects of the system that are drawing related. The drawing settings are displayed all at once on a single tabbed dialog.

1. Select Drawing Settings from the AutoTrack drop down menu or click the **Drawing Settings** button on the AutoTrack toolbar or type `ATRADRAWINGSETTINGS` at the command line. The Drawing Settings dialog will appear.



*Drawing Settings button*

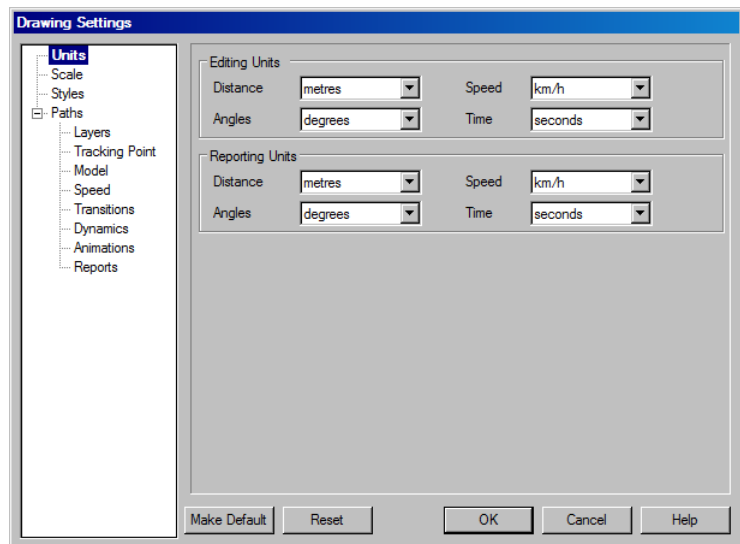


Drawing Settings dialog

2. Click the appropriate tab to edit or view the settings.
3. Edit the data as required and click **OK** to confirm when you are satisfied. Click **Cancel** to abort all changes and close the Drawing Settings dialog.
4. Click **Make Default** to save the displayed settings as defaults for the next session. Click **Reset** to restore your last saved default settings following changes.

## Drawing Settings: Units (2020)

1. Click on the **Units** tab.



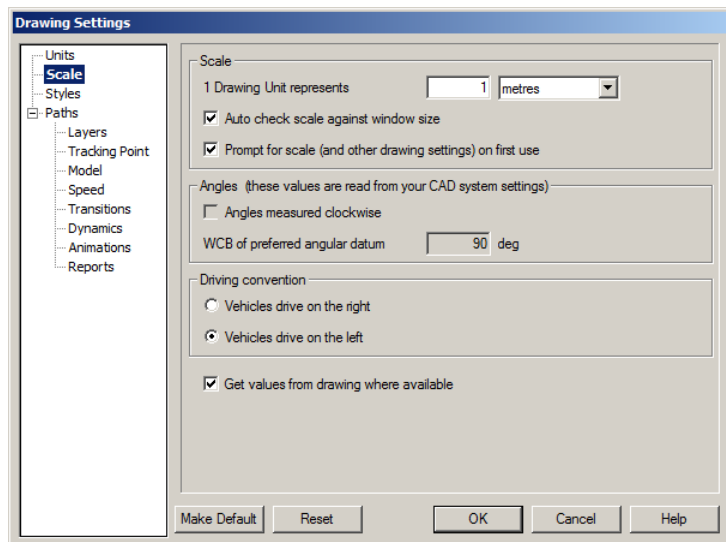
Drawing Settings dialog: Units tab

2. You can use different units for vehicle editing and viewing and for reporting. Select the units that you wish to use for **Distance**, **Angles**, **Speed** and **Time**.



## Drawing Settings: Scale <sup>(2030)</sup>

1. Click on the **Scale** tab.



Drawing Settings dialog: Scale tab

2. **AutoCAD**

Set the drawing units and scale by entering the number of distance units that **1 Drawing Unit represents** followed by the units. If you set this incorrectly your AutoTrack objects will appear at the wrong size relative to other objects.

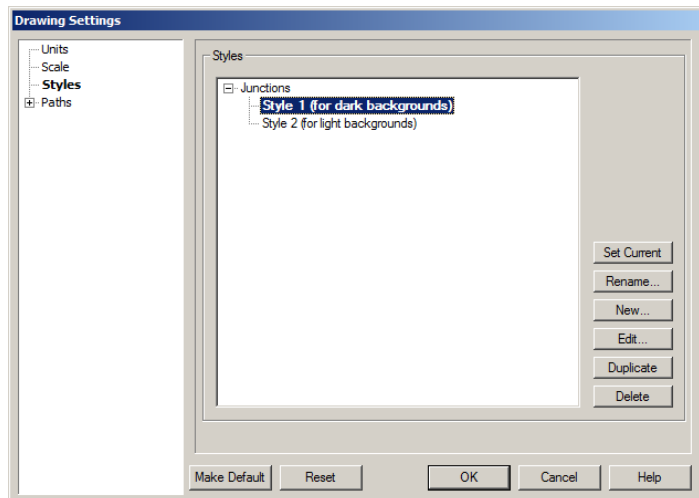
### MicroStation

Set the drawing units and scale by entering the number of distance units that **1 Master Unit represents** followed by the units. If you set this incorrectly your AutoTrack objects will appear at the wrong size relative to other objects.

3. Tick **Auto check scale against drawing extents** to have AutoTrack perform a crude scale check on existing drawings the first time an AutoTrack object is placed in a new drawing. This is a useful reminder if you have not set the drawing units and/or scale correctly.
4. Tick **Prompt scale before use** to have AutoTrack prompt you for a scale on new drawings. Note that this box is ticked by default for Novice users.
5. The middle frame labelled **Angles** contains values that are read from your CAD system settings and cannot be edited here. If you need to change these settings, do so through your CAD system.
6. **Driving Convention** determines the position of a driver or pilot if defined and therefore vehicle tracking if the tracking point is set to pilot/driver. It also affects the direction of angled parking bays according to direction of traffic flow if you are using the parking tools.
7. Tick **Get values from drawing where available** to read the scale and driving convention from the drawing. If this option is ticked the scale and driving convention fields on this dialog will be disabled.

## Drawing Settings: Styles <sup>(2320)</sup>

1. Styles determine the appearance of all objects in AutoTrack except swept paths which are controlled by reports.
2. Click on the **Styles** tab.

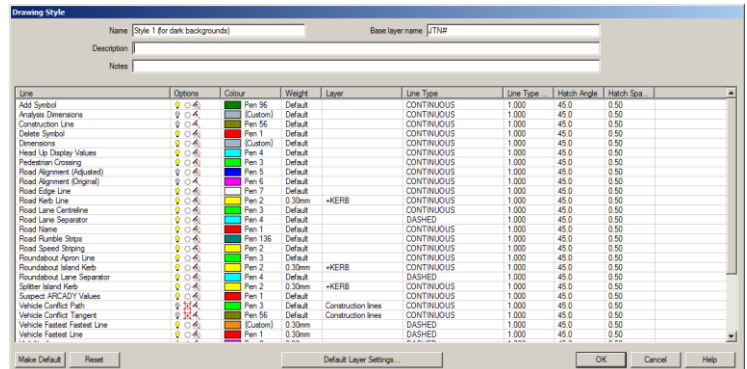


Drawing Settings dialog: Styles tab

3. The styles are listed by object type.
4. Highlight a style and click **Edit** to edit the selected style. The **Edit Drawing Style** dialog will appear.
5. Highlight a style and click **Duplicate** to make a copy. A new style based upon the selected one will be created and added to the list.
6. Highlight a style and click **Rename** to give the selected style a new name.
7. Click **New** to create a new style based upon the default object style. A new style will be created and added to the list.
8. Highlight a style and click **Delete** to remove a style from the list. You cannot delete locked styles or Savoy styles.

## Drawing Settings: Styles: Drawing Style <sup>(2330)</sup>

1. The Drawing Style dialog lets you change the way objects that use a given style are drawn.



### Drawing Settings: Styles: Drawing Style

9. The **Name** is used to identify the style. It can be useful if the name gives a clue as to the usage or format.
10. Use the **Description** and **Notes** if necessary to give further information regarding the style.
11. Different entities may be placed on different layers and the **Base Layer Name** allows you to define text that will prefix these layers. Use the # character to represent the junction number.
12. Three **Options** let you switch an entity on or off, define it as a construction line and let you display the entity while dragging. To change one of the Options flags simply click on it.
13. Select the **Colour & Weight** from the drop down lists.
14. If you want an entity to display on a different layer to the rest, then enter the required name if the **Layer** column. You may use the # character in the layer name to represent the junction number and if you prefix the name with a + it will append to the Base Layer Name. So, a base layer name of JTN# and style layer name of SUBLAYER would put the entity on a layer called JTN1SUBLAYER.
15. Select the **Line Type** from the drop down list. If the line type is not continuous then you may also set the **Line Type Scale** which controls the scale of the pattern.
16. Enter the **Hatch Spacing** and **Hatch Angle** in drawing units.
17. Click **Default Layer Settings** to define the settings for the user-defined layers if they have to be created.
18. Click **OK** to confirm or **Cancel** to abort.
19. Any changes that you make to existing entities will be reflected in any objects that use them.

#### Style Options:-



Visible On/Off



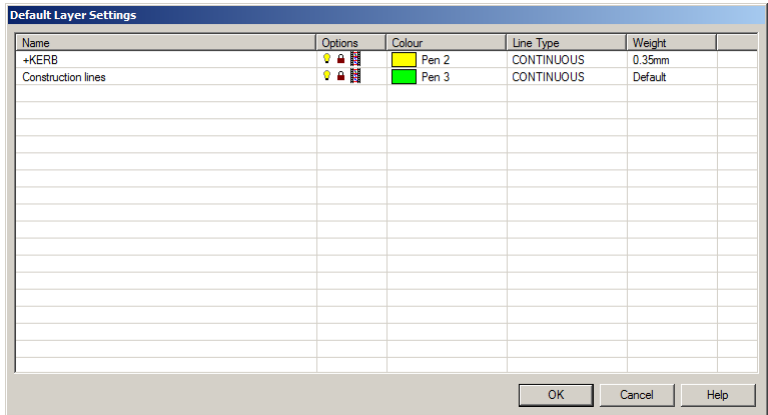
Construction Line



Drag Draw On/Off

**(2332)**

1. The Default Layer Settings dialog allows you to specify the settings to be used in the event that layers have to be created.



Drawing Settings: Styles: Drawing Style: Default Layer Settings

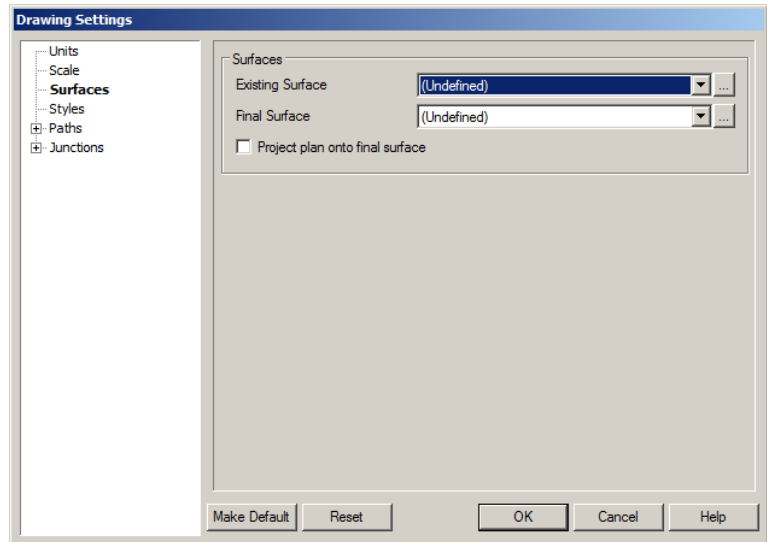
2. The dialog lists all the user-defined layers specified in the parent style sheet.
3. Select the **Colour**, **Line Type** and **Weight** for each layer.
4. Options allow you to set the initial on/off state and locked/unlocked.
5. A further option lets you specify whether the layers is on or off during 3D animation.

## Drawing Settings: Surfaces (2035)

### Note

*This tab is only visible if your CAD system and drawing format supports surfaces.*

1. Click on the **Surfaces** tab.



Drawing Settings: Surfaces tab

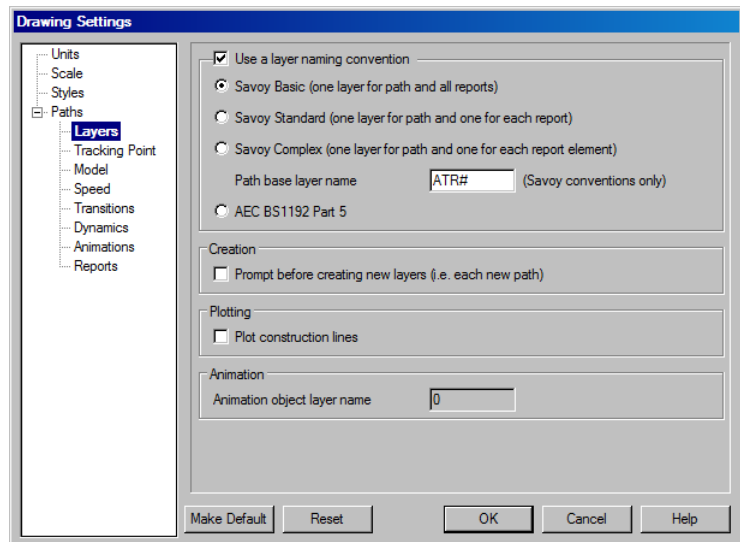
2. You may associate vehicle paths with surfaces in certain CAD systems. This allows you to display and animate 2D and 3D paths on the surface rather than at level 0.
3. The **Existing Surface** is only used by the Junctions module. Select from the drop down list or use the **Pick** button to select an object on the surface.
4. The **Final Surface** is the surface onto which objects may be projected. Select from the drop down list or use the **Pick** button to select an object on the surface.
5. Tick **Project plan onto final surface** to display AutoTrack objects (e.g. swept paths or roundabouts) 'draped' over the surface.

## Drawing Settings: Paths: Layers (all except MicroStation v8 onwards) <sup>(2060)</sup>

### Note

MicroStation users should refer to the next sections, [Drawing Settings: Paths: Levels \(MicroStation v8 onwards\)](#) and [Drawing Settings: Paths: Levels \(MicroStation pre-v8 only\)](#).

1. Click on the **Layers** tab.



Drawing Settings dialog: Layers tab

2. Tick **Use a layer naming convention** if you want AutoTrack to automatically place the entities that you create on separate logical named layers (strongly recommended).
3. If you opt not to use a layer naming convention all new paths will be placed on the current layer.
4. Select one of the **Savoy** conventions or the **AEC BS1192 Part 5** layer naming convention. See below for details of all the layer naming conventions.
5. The **Path base layer name** is the prefix applied to new layers. By default this is ATR followed by the path number which is expressed as 'ATR#' but it may be changed.
6. Tick **Prompt before creating new layers** to have AutoTrack warn before new layers are created. In practice this means you will be prompted with a default layer name before you start each new path (see Base Layer Name dialog below) and given the opportunity to change it.
7. By default AutoTrack construction lines are not plotted. If you want them to appear on output plots tick **Plot construction lines**.
8. The **Animation object layer name** is only used by MicroStation. It specifies the temporary layer used by the animation graphics.

### Note

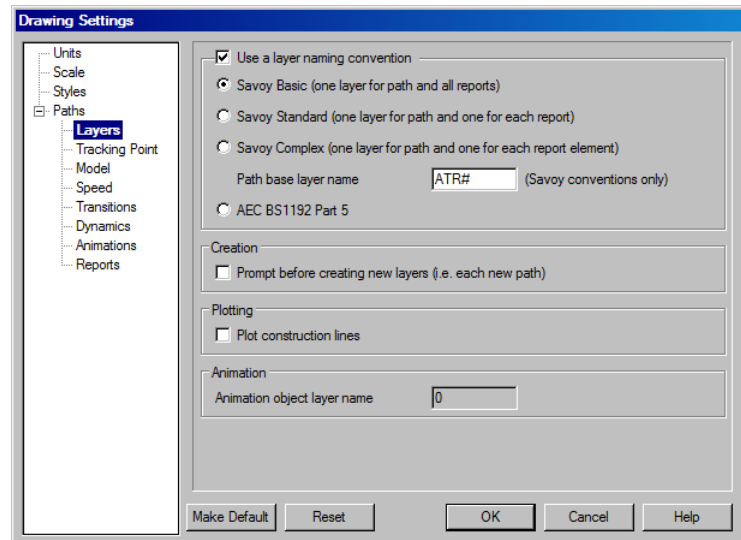
Adoption of a layer naming convention does not prevent you from renaming a layer later.

## Drawing Settings: Paths: Levels (MicroStation v8 onwards) <sup>(2067)</sup>

### Note

MicroStation pre-v8 users should refer to the next section [Drawing Settings: Paths: Levels \(MicroStation pre-v8 only\)](#).

1. Click on the **Levels** tab.



Drawing Settings dialog: Levels tab

2. Tick **Use a level naming convention** if you want AutoTrack to automatically place the entities that you create on separate logical named levels (strongly recommended).
3. If you opt not to use a level naming convention all new paths will be placed on the current level.
4. Select one of the **Savoy** conventions or the **AEC BS1192 Part 5** level naming convention. See below for details of all the level naming conventions.
5. The **Path base layer name** is the prefix applied to new layers. By default this is ATR followed by the path number which is expressed as 'ATR#' but it may be changed.
6. Tick **Prompt before creating new levels** to have AutoTrack warn before new levels are created. In practice this means you will be prompted with a default level name before you start each new path (see Base Level Name dialog below) and given the opportunity to change it.
7. The option to **Plot construction lines** is not available in MicroStation because that CAD system has a similar feature built-in.
8. The **Animation object layer name** is only used by MicroStation. It specifies the temporary layer used by the animation graphics.

### Note

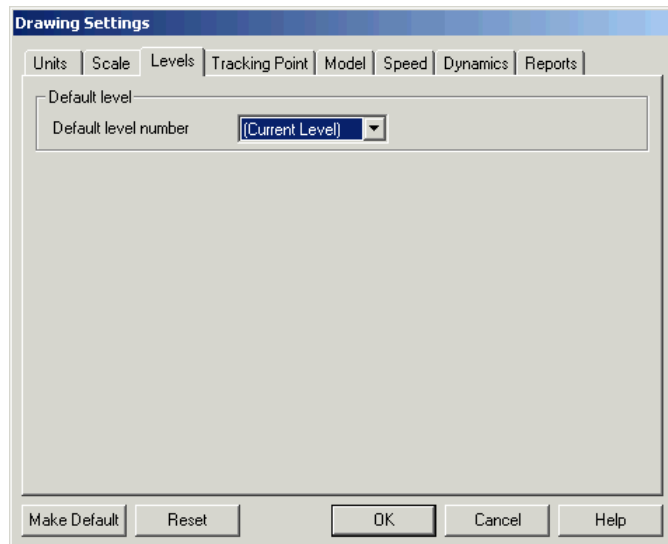
Adoption of a level naming convention does not prevent you from renaming a level later.

## Drawing Settings: Paths: Levels (MicroStation pre-v8 only) <sup>(2065)</sup>

### Note

Users of MicroStation v8 or later should refer to the previous section [Drawing Settings: Paths: Levels \(MicroStation v8 onwards\)](#).

1. Click on the **Levels** tab.



Drawing Settings dialog: Levels tab

2. Select the level on which you want AutoTrack to place new paths.

### Note

Setting the report level does not change the active level.



## Layer / Level naming conventions

AutoTrack has four built in layer or level naming conventions.

### ***Savoy Basic Layer/Level naming convention***

Under the Savoy basic naming convention all path and report data is placed on a single layer or level named:-

ATRxx

where:-

xx is the path number

Note that this is also the base layer or level name for the other Savoy naming conventions.

The path and all report elements have explicitly defined colours and line types. Their colours and line types cannot therefore be changed by changing layer or level settings.

Parking bays are placed on layers named **Bays** and parking islands on a layer called **Islands**.

### ***Savoy Standard Layer/Level naming convention***

Under the Savoy standard naming convention the path data and construction lines are placed on layers or levels named:-

ATRxx

and each report is placed on a layer or level named:-

ATRxxRyy

where:-

xx is the path number

yy is the report number

The path and all report elements have explicitly defined colours and line types. Their colours and line types cannot therefore be changed by changing layer or level settings.

Parking data is placed on layers as per the basic convention except that construction lines are now separated and placed on a layer called **BayConstruction**.

### ***Savoy Complex Layer/Level naming convention***

Under the Savoy complex naming convention the layers or levels are named as follows:-

ATRxxRyyrd

where:-

xx is the path number

yy is the report number (on this path)

r is the report subject (Body, Chassis, Path, Symbols, Text)

d is the direction of travel of the vehicle (Forward or Reverse).

**Note**

*The direction is not used on reports that use a single layer or level.*

The path and all report elements have explicitly defined colours and line types. Their colours and line types cannot therefore be changed by changing layer or level settings.

Each different type of parking data is placed on a different layer, e.g. privacy posts are placed on a layer called **PrivacyPosts**. In addition each type of construction line is placed on its own layer, e.g. flow direction arrows are placed on a layer called **RowFlowDirection**.

**AEC BS1192 Part 5 Layer/Level naming Convention**

Under the AEC naming convention the layers or levels are named as follows:-

V070PX\$??GBATRxRyyrd

where:-

??	is the current elevation (00 if none found)
xx	is the path number
yy	is the report number (on this path)
r	is the report subject (Body, Chassis, Path, Symbols, Text)
d	is the direction of travel of the vehicle (Forward or Reverse).

**Note**

*The direction is not used on reports which use a single layer or level.*

The default discipline code (v) (which is not listed in the AEC disciplines) has been chosen because AutoTrack is used by professionals from a wide range of disciplines and this code allows the AutoTrack vehicle data to be isolated. Likewise the part code is normally discipline dependent so an unallocated code (070) has been selected for use here. Finally, pen colour or type is user dependent so code P is used here. All layer names can be edited if required.

The path and all report elements have explicitly defined colours and line types. Their colours and line types cannot therefore be changed by changing layer or level settings.

Parking data is placed on the same layers as the Savoy Complex convention.

**Base layer or level name (Base Layer/Level Name dialog)**  
(5120)

The base layer or level name is the part of the name to which is appended the sub-text appropriate to the selected naming convention. Thus if you use the Standard Savoy naming convention and change the default base layer/level name to **BASENAME** the layers or levels generated will be of the form...

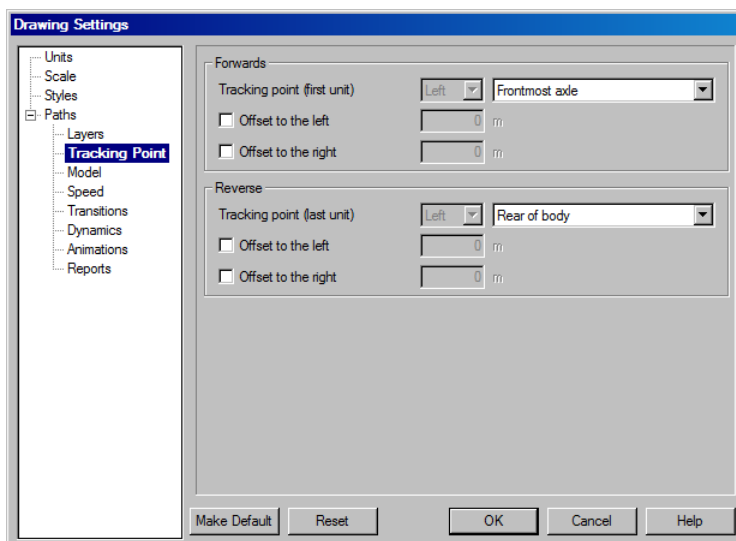
BASENAMERyyrd

instead of...

ATRxRyyrd

## Drawing Settings: Paths: Tracking Point (Roads & Airports) <sup>(2170)</sup>

1. The path travelled by the vehicle is the line connecting the target points travelled by a specified tracking point on the vehicle. A tracking point on the first unit of the vehicle is used when the vehicle is travelling forwards and a point on the last unit when it is reversing. The tracking point is also the point that follows the line in the Follow drive mode.
2. Click on the **Tracking Point** tab.

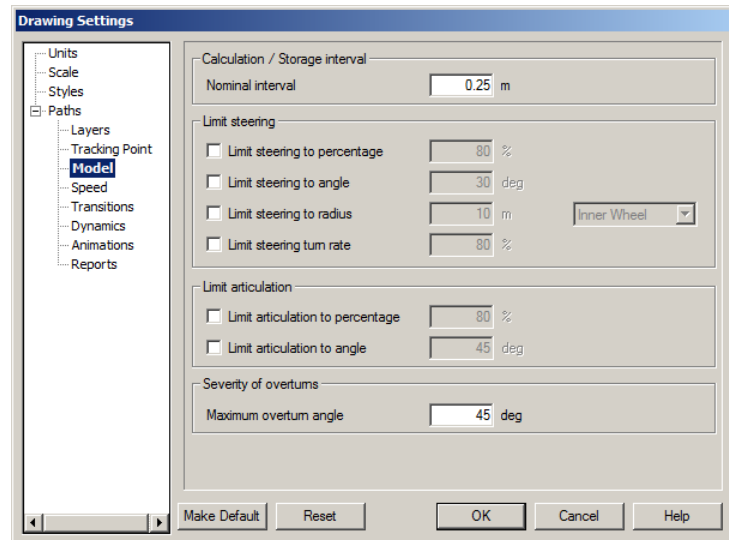


Drawing Settings dialog: Tracking Point tab

3. Set the **Forwards Tracking Point** to the point you wish to track while the vehicle is moving forwards. Note that some of the options require you to select left or right using the adjacent drop down list box. With the exception of **Pilot / Driver** and **User Defined Point** the tracking point is assumed to be on the centre line of the unit. Note that front tracking points on a front steered vehicle tend to give better results than rear tracking points.
4. If you want to specify a point offset from the centre line then tick **Offset to the left** or **Offset to the right** as appropriate and enter the offset distance.
5. If you want to specify a particular point then set the Tracking Point to **User Defined Point** and enter the coordinates explicitly. X is measured from the front coupling or, if there is no front coupling, from the front axle, increasing positive towards the back of the unit; and Y is measured positive to the right of the centre line.
6. If you are modeling aircraft using Follow you should set this to **Pilot / Driver** or **Cockpit** if you want to simulate pilot's eye tracking.
7. The **Reverse Tracking Point**, the point that you want to track while the vehicle is moving backwards, is set in exactly the same way.

## Drawing Settings: Paths: Model (Roads & Airports) <sup>(2070)</sup>

1. The Model settings are used to limit the turning or articulation capability of the vehicle. This may be used to create a more conservative analysis.
2. Click on the **Model** tab.



Drawing Settings dialog: Model tab

3. **Nominal storage interval** is the frequency at which points on the path and reports are calculated and saved to the drawing. Reducing this value will make the program run slower because it is performing more calculations. Increasing this value will lose accuracy. This value may not be greater than 75% of the shortest wheelbase of any unit in the driven vehicle.
4. By default the program uses the steering and articulation limits defined in your vehicles. However, the settings on this tab allow you to temporarily change these limits.
5. You may limit the allowable steering lock in three mutually inclusive ways. The program will calculate new steering capabilities based upon the selected methods and use these new limits in all driving calculations unless they exceed the physical vehicle capabilities.

Select **Percentage of maximum** to change the steering capability of your selected vehicle as a factor of the actual maximum steering angle. Note that this is the only vehicle independent way to limit the steering angle.

Select **Absolute angle** to set a new maximum steering angle.

Select **Equivalent turning radius** to specify the maximum steering angle in terms of an equivalent radius. The radius may be to the inside of the inner wheels, the outside of the outer wheels, or the centreline of the steered axle.

Select **Limit steering turn rate** to specify the maximum rate at which steering can be applied as a percentage of the actual maximum.

6. You may limit the allowable articulation angles in two mutually inclusive ways. The program will calculate new articulation

capabilities for all units based upon this figure and use these new limits in all driving calculations unless they exceed the physical vehicle capabilities.

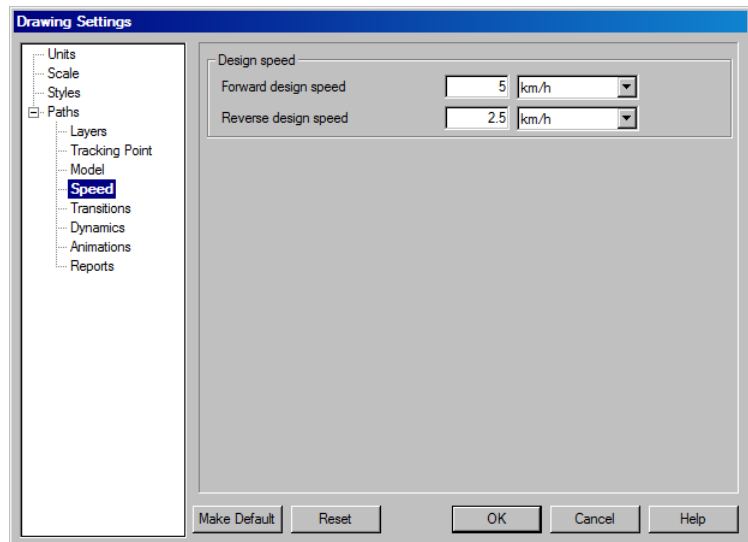
Select **Percentage of maximum** to change the articulation limits of your selected vehicle as a factor of the actual maximum articulation angle. Note that this is the only vehicle independent way to limit articulation angles.

Select **Absolute angle** to set a new maximum articulation angle.

7. Overturns are when the vehicle turns sideways in the opposite direction prior to making a turn or when the vehicle continues forwards and turns late. Both are performed to minimize cut-in. The **Maximum overturn angle** is a way to limit the severity of the overturn by restricting the angle of deviation from a “normal” path.

## Drawing Settings: Paths: Speed (Roads, Rail & Airports) <sup>(2080)</sup>

1. The design speed affects controls how fast the manoeuvre is animated and may also affect the shape of turns on some versions of AutoTrack if a speed dependent turn transition is enabled.
2. Click on the **Speed** tab.



Drawing Settings dialog: Speed tab

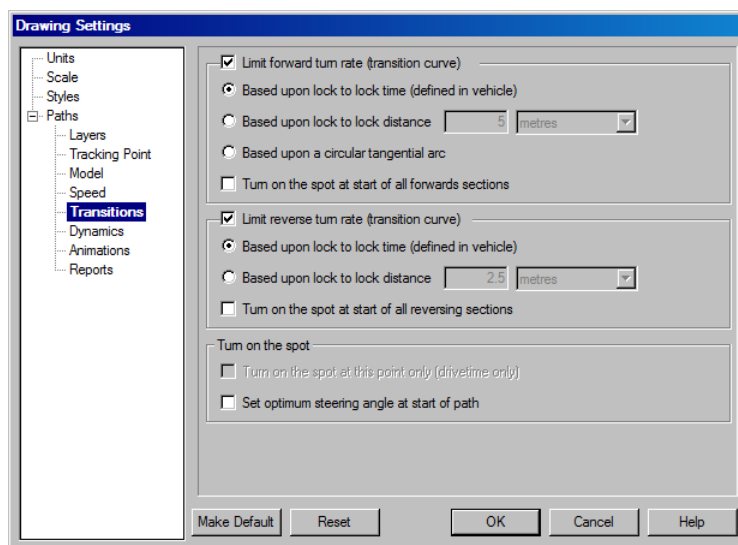
3. You may specify different values for the **Forward design speed** and **Reverse design speed** since typically you would travel slower in reverse. Note that the vehicle movement will always be modeled at the design speed regardless of the rate at which you choose to animate the manoeuvre on screen.

### Warning

*If you are modelling turns at speeds greater than 15kph we strongly recommend that you limit the turn radius. Go to either the **Model** tab or the **Dynamics** tab.*

## Drawing Settings: Paths: Transitions (Roads & Airports) <sup>(2085)</sup>

1. The Transitions settings control how fast the steering angle changes into and between turns.
2. Click on the **Transitions** tab.



Drawing Settings dialog: Transitions

3. By default the rate at which the steering can be turned is limited. This reflects the real life situation in which the vehicle is moving whilst steering lock is being applied. Tick **Limit forward turn rate** and/or **Limit reverse turn rate** to prevent instantaneous application of lock while travelling forwards or backwards respectively. Note that this setting can also be changed during driving if necessary.

### Note

*Disabling turn rates is equivalent to the use of the Turn on the Spot feature in version 2 of AutoTrack.*

4. The steering turn rate can be limited in one of three ways. Either by defining the speed of the vehicle which is then used in conjunction with the vehicles lock to lock time or, by explicitly defining the lock to lock distance (i.e. the distance travelled in the lock to lock time), or by the pure geometric calculation of a circular arc.

Select **Based upon lock to lock time** to impose a turn rate that causes the turn radius to increase with speed. The turn rate (degrees per unit of distance) will be calculated as follows:-

$$R = A / v t$$

Select **Based upon lock to lock distance** to impose a limit that is fixed for all speeds. The turn rate (degrees per unit of distance) will be calculated as follows:-

$$R = A / d$$

Where:-

**R** is Max Turn Rate

**A** is Max Steering Angle

<b>v</b>	is Design Speed
<b>t</b>	is Lock to Lock Time
<b>d</b>	is Lock to Lock Distance

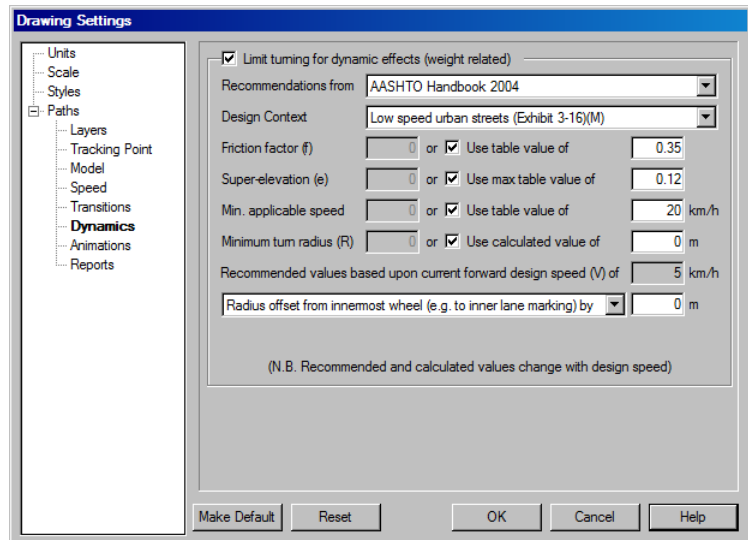
Select **Based upon circular tangential arc** if you want the tracking point (typically the centre of the steered wheels) to follow a perfectly circular arc irrespective of speed or lock to lock time. Note that this is the model used by several organisations to generate design vehicle turn templates (e.g. AASHTO, TAC). This mode can only be used with tracking points that are in front of (relative to the direction of motion) the minimum cut-in point.

5. The turn transitions can also be disabled automatically at changes of direction. Tick **Turn on the spot at start of all forwards sections** to automatically disable turn transitions when you stop reversing and start travelling forwards or **Turn on the spot at start of all reverse sections** to disable them when to stop travelling forwards and start reversing.
6. Finally, to force AutoTrack to set the best possible starting steering angle at just the start of the path tick **Set optimum steering angle at start of path**.



## Drawing Settings: Paths: Dynamics (Roads & Airports) <sup>(2180)</sup>

1. The Dynamics settings limit the turning radii for comfort at higher speeds. The automatically generated values are based upon published documents.
2. Click on the **Dynamics** tab.



Drawing Settings dialog: Dynamics tab

3. If you want to limit the turning radius for super elevation and side friction tick the **Limit Turning for Dynamic Effects** box.
4. You may use automatically generated values from various references or set your own limiting values.
5. If you wish to use values from one of the available sources select from the **Recommendations from** and **Design Context** drop down lists. The units used for each design context are indicated with (M) or (US) in the context name representing metric and US customary units respectively.

### Note

*Speeds are displayed in the same units as the current design speed and radii are displayed in the same units as the drawing scale.*

6. The recommended and calculated fields will change to reflect your selections. The distance data will be presented in drawing units and the speed in same units as your design speed.
7. If you do not want to use one of the recommended values you should clear the **Use table value** box and enter the required value in the edit box.

### Note

*The table values are taken straight from the appropriate reference table, which although based upon an equation, may be rounded. If you choose to use any of your own values AutoTrack will use the base equation to calculate the recommended limiting turn radius. This means that you may get slightly different values if you manually enter a value that is the same as a recommended value.*

8. The **Side friction factor (f)** is the ratio of the force parallel to the road surface and the reaction perpendicular to the road surface and the recommended values are all based upon comfort limits rather than physical skidding limits.
9. The **Super elevation (e)** is the slope of the road surface at right angles to the direction of vehicle travel. It is expressed as a factor so 2% super elevation should be entered as 0.02.
10. The table values are used for all speeds above a **Min. applicable speed (V)** which is the lowest speed listed in each table.
11. The recommended **Minimum turn radius (R)** that is displayed relates to the current forward design speed (which is shown on the same dialog). The values used will change as you vary the speed. They do not apply in reverse. AutoTrack will use the value listed in a table if the current forward design speed is within 0.5kph. If the design speed is outside this tolerance then the limiting radius will be calculated direct using the curve formulae relevant to the design publication and context.

The equation used for limiting values of e and f is:-

$$R = V^2 / 127 (e+f)$$

Where:-

- R** is Minimum Turn Radius (m)
- V** is Design Speed (km/h)
- e** is Maximum Super-elevation (expressed as m/m)
- f** is Side Friction Factor

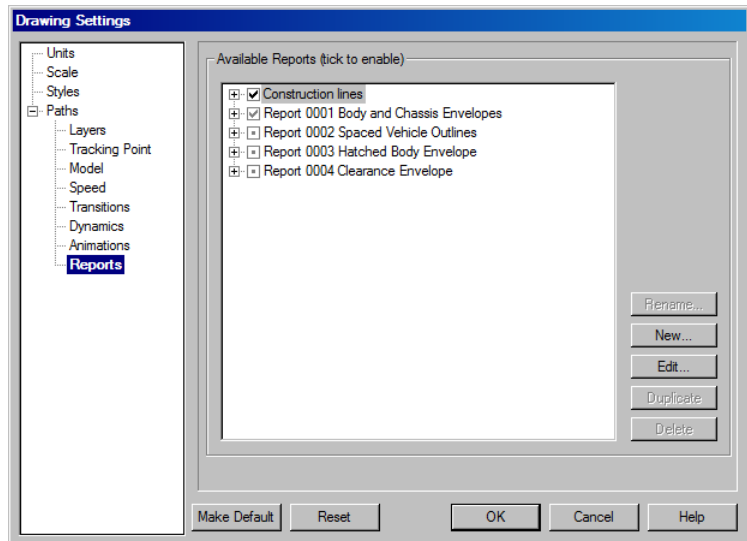
If the sum of super elevation and side friction factor is zero the minimum turn radius will not be calculated.

The radius relates either to the outermost wheel track, the innermost wheel track or the centre of the steered wheels. Select it from the drop down list box. The defaults for this field vary according to the selected table and are based upon advice from AASHTO representatives. If you select **Radius is offset from outermost wheel track** or **Radius is offset from innermost wheel track** then the calculated limiting wheel angle is based upon the path the vehicle must steer to keep the wheels just within the outer lane marking or just outside the inner lane marking respectively. In reality you will probably want to model the vehicle travelling some distance away from the lane marking to avoid collisions with vehicles in adjacent lanes or oncoming vehicles. Enter the clearance between the vehicle wheel envelope and the lane marking in the edit box provided.

AutoTrack will prevent a vehicle from using the limiting radius if it is lower than its design capabilities.

## Drawing Settings: Paths: Reports (3000)

1. The Reports dialog allows you to change the reports displayed.
2. Click on the **Reports** tab.



Drawing Settings dialog: Reports tab

3. Each path may have one or more reports each comprising a defined set of sub-reports. In addition each path has a special construction lines report comprising various sub-reports. You may view the sub-reports by clicking on the + symbol.
4. The reports listed on this screen are applied by default to new paths but you may tick or untick the box adjacent to each title to enable or disable elements.

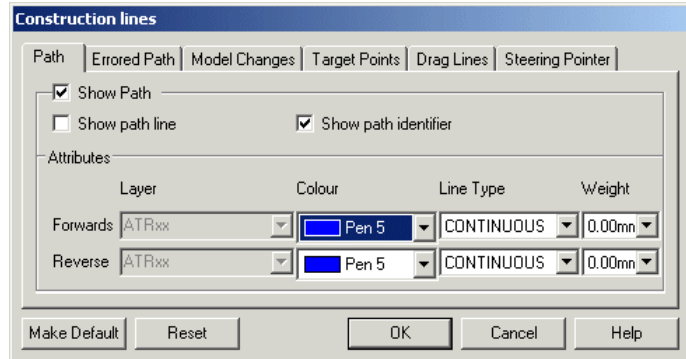
### Tip

*When you have completed your path it often clarifies the presentation if you switch off all construction lines by unticking the **Construction Lines** box in the **Reports** view.*

5. In many cases it will only be necessary to define a single report here but you may wish to add more default reports. There must always be at least one report.
6. Click **Edit** to edit a sub-report. The appropriate Report Details dialog will appear.
7. Click **Copy** to make a copy of the current report. A new report will be added to the list and can be edited in the normal way. You cannot copy a sub-report.
8. Highlight a report and click **Rename** to give the report a new title. You cannot rename Construction Lines.
9. Click **New** to define a new report. A new report will be added to the list (with system default settings) which can be edited in the normal way. You cannot add a sub-report.
10. Click **Delete** to remove a report from the list.

## Drawing Settings: Paths: Construction Lines (3160)

1. Construction Lines may prove useful whilst creating the path but would normally be disabled for the final report.
2. Click on the appropriate tab and tick the **Show...** box of those elements that you want.



Drawing Settings: Construction Lines

3. The following applies to all six types of construction lines. However, there are some options that apply only to particular types. These are listed at the end.
4. **Path** is the locus of the tracking point.  
**Errored Path** is a line connecting the target points of those sections of the path that cannot be performed.  
**Model Changes** are represented by an octagonal symbol and include speed changes and changes to the transition type.  
**Target Points** are shown as small crosses.  
**Drag Lines** are shown connecting the driving grip and the centres of the front and rear axles.  
**Steering Pointer** is a line or arrow projecting from the centre of the steered axle a distance equal to the wheelbase of the unit.
5. Select the **Colour** from the drop down list box. 255 pen colours are listed. To use a colour that is not listed select **Custom** and click on the colour swatch to select from a colour chart.

### AutoCAD only

*The pen numbers directly correlate with AutoCAD's pen numbering system (colour indices in later versions). If you select a custom colour that does not correspond to a defined pen colour it will be treated as TrueColor.*

6. Select the **Line Type** from the drop down list box.
7. Enter a line **Weight** for the report. 0.0mm is the default and forces the thinnest possible line. Wider lines are drawn symmetrically about the centreline. (Not available in AutoCAD R14).

### Note

*Variations in line weight are only visible on printed output or in a print preview.*

## Drawing Settings: Construction Lines: Path

1. Select **Show path line** to display the path of the tracking point.

2. Select **Show path identifier** to display the path number adjacent to each path.

### ***Drawing Settings: Construction Lines: Drag Lines***

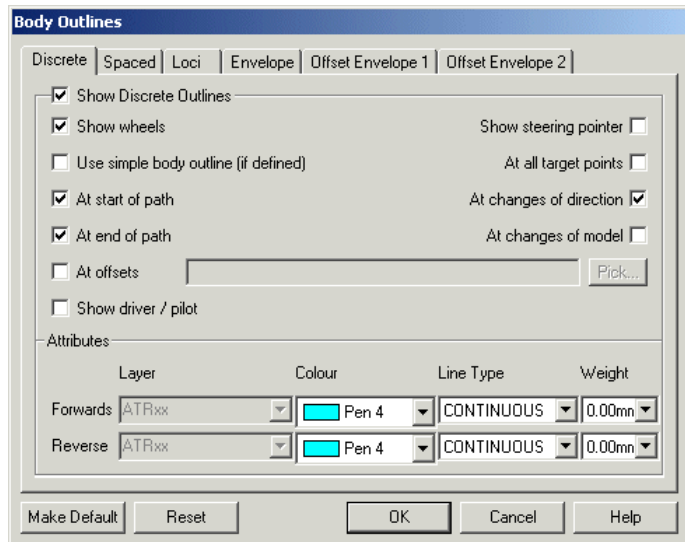
1. Select **Show overturn draglines** to display editing draglines at overturns.
2. Select **Show extend path draglines** to display draglines extending from the front and rear of the vehicle. These may be used to extend the path by one section at a time.

### ***Drawing Settings: Construction Lines: Steering Pointer***

1. Select **Show steering percentage** to display the physical steering angle as a percentage of the maximum possible.
2. Select **Use simple steering pointer** to display the steering pointer as a line instead of as an arrow.

## Drawing Settings: Paths: Reports: Discrete <sup>(3020)</sup>

1. This controls the appearance of the discrete outlines sub-report. It is applicable to various report types, including body, chassis, loads, etc. Each different report type may have different settings for its discrete sub-report.
2. Click on the **Discrete** tab.



Body Outlines Report dialog: Discrete tab  
(other discrete outline reports similar)

3. Tick **Show Discrete Outlines** to enable this element.
4. Tick the boxes to specify the features that you want.

The option **At all Discrete Body Outlines** is available on all but the Body Outline sub-report.

The option **Use simple body outline** is only available on the discrete and spaced body outline reports. It uses the outlines defined in the vehicle's Body Outline (Plan) outline type instead of those in Body Detail (Plan).

The option to display **Label Text** is only available on the Annotation report. Leave the Label Text field blank to display the vehicle name; the text - **Vehicle Name** - will automatically appear in the edit box.

5. Tick **At Offsets** to show outlines at specified positions. Enter the distances from the start of the path in the adjacent box. You should use commas to separate distances, e.g. 10.4, 15.6, 23.9 would draw body outlines at distances of 10.4, 15.6, and 23.9 in the current units. Click the **Pick** button to select positions graphically.

### Tip

You may find it easier to use the **Place Outline** command to position outlines at irregular offsets. (see [Placing discrete body outlines](#))

6. Tick **Show driver / pilot** to display an icon representing the driver's location. Note that the position of the driver can be adjusted in the vehicle details.

7. If you are using a layering convention then you will not be allowed to specify the report **Layer** (**Level** on MicroStation). Otherwise, you may select from the existing layers or specify a new layer for the report.
8. Select the **Line Type** from the drop down list.
9. Select the **Colour** from the drop down list box. 255 pen colours are listed. To use a colour that is not listed select **Custom** and click on the colour swatch to select from a colour chart.

**AutoCAD only**

*The pen numbers directly correlate with AutoCAD's pen numbering system (colour indices in later versions). If you select a custom colour that does not correspond to a defined pen colour it will be treated as TrueColor.*

10. Enter a line **Weight** for the report. 0.0mm is the default and forces the thinnest possible line. Wider lines are drawn symmetrically about the centreline. (Not available in AutoCAD R14).

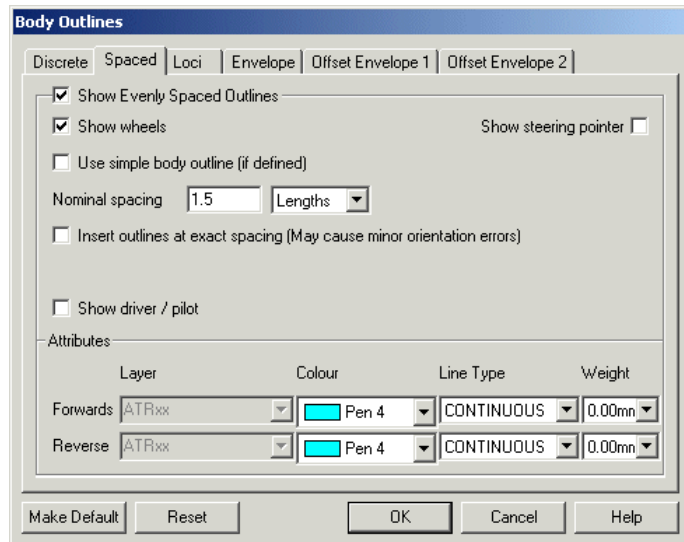
**Note**

*Variations in line weight are only visible on printed output or in a print preview.*

11. Tick **Fill** to solid fill the body outlines (AutoCAD versions only).

## Drawing Settings: Paths: Reports: Spaced <sup>(3030)</sup>

1. This controls the appearance of the spaced outlines sub-report. It is applicable to various report types, including body, chassis, loads, etc. Each different report type may have different settings for its spaced sub-report.
2. Click on the **Spaced** tab.



Body Outlines Report dialog: Spaced tab  
(other spaced outline reports similar)

3. Tick **Show Evenly Spaced Outlines** to enable this element.
4. Tick the boxes to specify the features that you want.

The option **Use simple body outline** is available on only the discrete and spaced body outline reports. It uses the outlines defined in the vehicle's Body Outline (Plan) outline type instead of those in Body Detail (Plan).

The option to display **Label Text** is available only on the Annotation report. Leave the Label Text field blank to display the vehicle name; the text - **Path Number** - will automatically appear in the edit box.

5. Enter the required **Nominal Spacing** for the outlines. This will place outlines at the closest stored position after the specified distance.
6. If you want the spacing to be precise instead of approximate tick **Insert outlines at exact spacing**. However, note that since the vehicle orientation must be interpolated, it may be very slightly inaccurate. Therefore, for best accuracy, we recommend that you use nominal spacing.
7. Tick **Show driver / pilot** to display an icon representing the driver's location. Note that the position of the driver can be adjusted in the vehicle details.
8. If you are using a layering convention then you will not be allowed to specify the report **Layer (Level on MicroStation)**. Otherwise, you may select from the existing layers or specify a new layer for the report.



9. Select the **Line Type** from the drop down list.
10. Select the **Colour** from the drop down list box. 255 pen colours are listed. To use a colour that is not listed select **Custom** and click on the colour swatch to select from a colour chart.

**AutoCAD only**

*The pen numbers directly correlate with AutoCAD's pen numbering system (colour indices in later versions). If you select a custom colour that does not correspond to a defined pen colour it will be treated as TrueColor.*

11. Enter a line **Weight** for the report. 0.0mm is the default and forces the thinnest possible line. Wider lines are drawn symmetrically about the centreline. (Not available in AutoCAD R14).

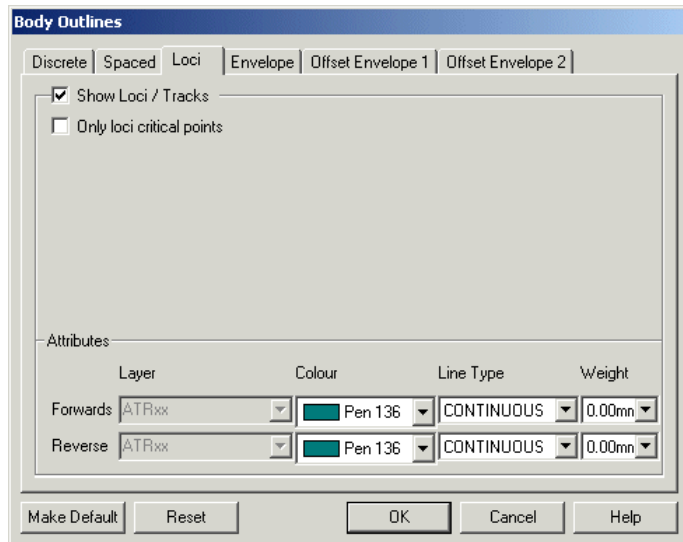
**Note**

*Variations in line weight are only visible on printed output or in a print preview.*

12. Tick **Fill** to solid fill the body outlines (AutoCAD versions only).

## Drawing Settings: Paths: Reports: Loci <sup>(3040)</sup>

1. This controls the appearance of the loci sub-report. It is applicable to various report types, including body, chassis, loads, etc. Each different report type may have different settings for its loci sub-report.
2. Click on the **Loci** tab.



Body Outlines Report dialog: Loci tab  
(other loci reports similar)

3. Tick **Show Loci / Tracks** to enable this element.
4. The Body outline report has an option **Only loci critical points**. Tick this option to trace only the front offside corners of the body and the cut-in points on each side.
5. The Chassis report has an option **Show outermost tyre tracks**. Tick this option to show the path of the inside face of the outermost tyres, i.e. if the vehicle has twin wheels then only the outer one is tracked.
6. If you are using a layering convention then you will not be allowed to specify the report **Layer (Level on MicroStation)**. Otherwise, you may select from the existing layers or specify a new layer for the report.
7. Select the **Line Type** from the drop down list.
8. Select the **Colour** from the drop down list box. 255 pen colours are listed. To use a colour that is not listed select **Custom** and click on the colour swatch to select from a colour chart.

### AutoCAD only

*The pen numbers directly correlate with AutoCAD's pen numbering system (colour indices on later versions). If you select a custom colour that does not correspond to a defined pen colour it will be treated as TrueColor.*

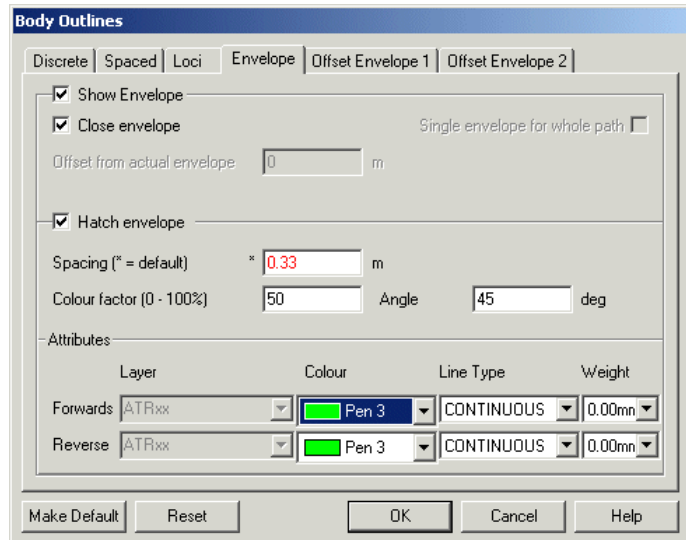
9. Enter a line **Weight** for the report. 0.0mm is the default and forces the thinnest possible line. Wider lines are drawn symmetrically about the centreline. (Not available in AutoCAD R14).

**Note**

*Variations in line weight are only visible on printed output or in a print preview.*

## Drawing Settings: Paths: Reports: Envelope (3050)

1. This controls the appearance of the envelope sub-report. It is applicable to various report types, including body, chassis, loads, etc. Each different report type may have different settings for its envelope sub-report.
2. Click on the **Envelope** tab.



Body Outlines Report dialog: Envelope tab  
(other envelope reports similar)

3. Tick **Show Envelope** to display an envelope of the movement of the vehicle.
4. Tick **Close Envelope** to join the left and right boundaries at the front and the back.
5. Tick **Hatch Envelope** to fill the envelope with hatch lines of the same type as the envelope itself.
6. **Hatch spacing** defaults to a value appropriate to the size of the vehicle, i.e. large vehicles such as aircraft will have a wider spacing than smaller vehicles such as cars.
7. The colour of the hatching is always a proportion of the envelope colour. By default, if the envelope colour is bright green the hatch colour will be dark green. The **Hatch Colour Factor** may be set to change this. A value of 100 represents 100% of the envelope colour, i.e. the same colour as the envelope.
8. Set the **Hatch Angle** to adjust the appearance of the hatching and allow overlain hatched areas to be visible.
9. Tick **Cross hatch in reverse** to hatch the envelope for reverse sections of the path in the opposite direction to the forwards sections.
10. If you are using a layering convention then you will not be allowed to specify the report **Layer** (**Level** on MicroStation). Otherwise, you may select from the existing layers or specify a new layer for the report.
11. Select the **Line Type** from the drop down list.
12. Select the **Colour** from the drop down list box. 255 pen colours are listed. To use a colour that is not listed select **Custom** and

click on the colour swatch to select from a colour chart.

**AutoCAD only**

*The pen numbers directly correlate with AutoCAD's pen numbering system (colour indices on later versions). If you select a custom colour that does not correspond to a defined pen colour it will be treated as TrueColor.*

13. Enter a line **Weight** for the report. 0.0mm is the default and forces the thinnest possible line. Wider lines are drawn symmetrically about the centreline. (Not available in AutoCAD R14).

**Note**

*Variations in line weight are only visible on printed output or in a print preview.*

14. Tick **Fill** to solid fill the envelope (AutoCAD versions only).

## Drawing Settings: Paths: Reports: Offset Envelope 1

### Note

*Offset Envelope 2 is similar.*

1. These control the appearance of each of the offset envelope sub-reports. They are applicable to various report types, including body, chassis, loads, etc. Each different report type may have different settings for its offset envelope sub-report.
2. Click on the **Offset Envelope 1** tab.
3. Tick **Show Body Offset Envelope 1** to add a clearance or safety envelope around the static envelope.
4. Enter a value for **Offset from actual envelope**. Note the default values are arbitrary.
5. Tick **Close Envelope** to join the left and right boundaries at the front and the back.
6. Tick **Hatch Envelope** to fill the envelope with hatch lines of the same type as the envelope itself.
7. **Hatch spacing** defaults to a value appropriate to the size of the vehicle, i.e. large vehicles such as aircraft will have a wider spacing than smaller vehicles such as cars.
8. The colour of the hatching is always a proportion of the envelope colour. For example, if the envelope colour is bright green the hatch colour will be dark green. The **Hatch Colour Factor** may be set to change this. A value of 100 represents 100% of the envelope colour, i.e the same colour as the envelope.
9. Set the **Hatch Angle** to adjust the appearance of the hatching and allow overlain hatched areas to be visible.
10. Tick **Cross hatch in reverse** to hatch the envelope for reverse sections of the path in the opposite direction to the forwards sections.
11. If you are using a layering convention then you will not be allowed to specify the report **Layer (Level on MicroStation)**. Otherwise, you may select from the existing layers or specify a new layer for the report.
12. Select the **Line Type** from the drop down list.
13. Select the **Colour** from the drop down list box. 255 pen colours are listed. To use a colour that is not listed select **Custom** and click on the colour swatch to select from a colour chart.

### AutoCAD only

The pen numbers directly correlate with AutoCAD's pen numbering system (colour indices on later versions). If you select a custom colour that does not correspond to a defined pen colour it will be treated as TrueColor.

14. Enter a line **Weight** for the report. 0.0mm is the default and forces the thinnest possible line. Wider lines are drawn symmetrically about the centreline. (Not available in AutoCAD R14).

### Note

Variations in line weight are only visible on printed output or in a print preview.

15. Tick **Fill** to solid fill the envelope (AutoCAD versions only).

## Drawing Settings: Paths: Reports: Visibility <sup>(3782)</sup>

1. The Visibility report settings control the appearance of the path visibility report. This report tests for visibility of an object vehicle identical to the subject vehicle.
2. Click on the **Sightlines** tab.

Visibility Sightlines

Sightlines | Discrete | Spaced

Sightlines

Viewpoint ☒ Centre of front axle ☐ Driver

Target ☒ Centre of body ☐ Corners of vehicle

Side offset distance  m

☒ Fixed distance

When going forwards  m

When going in reverse  m

☐ Based on vehicle speed

Driver reaction time  s

Rate of deceleration  m/sec2

Make Default Reset OK Cancel Help

Visibility Sightlines Report dialog

3. Select the sightlines **Viewpoint** as either **Centre of front axle** or **Driver**.
4. Select the sightlines **Target** as either the **Centre of front of vehicle** or **Nominal front corners of the vehicle**.
5. The **Side Offset Distance** is added either side of the target point(s).
6. The sightline distance may either be a fixed distance or a stopping distance based upon the vehicle speed:-

If you select **Fixed sightline distance** you may specify forward and reverse distances.

If you select **Sightline distance based on speed** you must specify the **Driver reaction time** and **Rate of deceleration**.

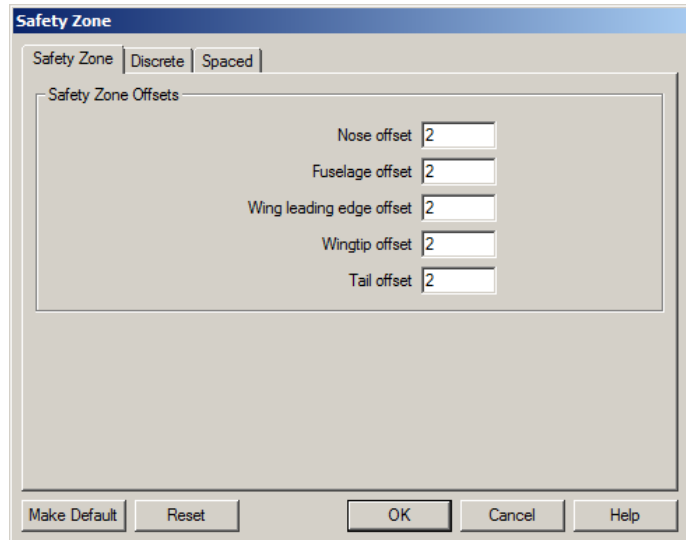
7. Click on **Discrete** and/or **Spaced** to specify where on the path the sightlines should be displayed.



## Drawing Settings: Paths: Safety Zone <sup>(3776)</sup>

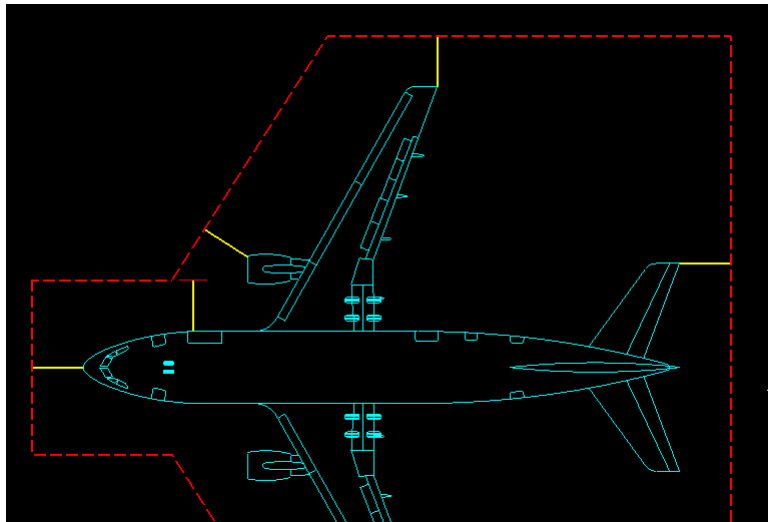
The Safety Zone report settings control the appearance of the Safety Zone report used on aircraft. The safety zone is an area formed by a polygon whose sides are offset from the nose, fuselage, the leading edges of the wings, the wingtips and the tail.

1. Click on the **Safety Zone** tab.



Safety Zone Report dialog

2. The offsets are as shown in the diagram below.

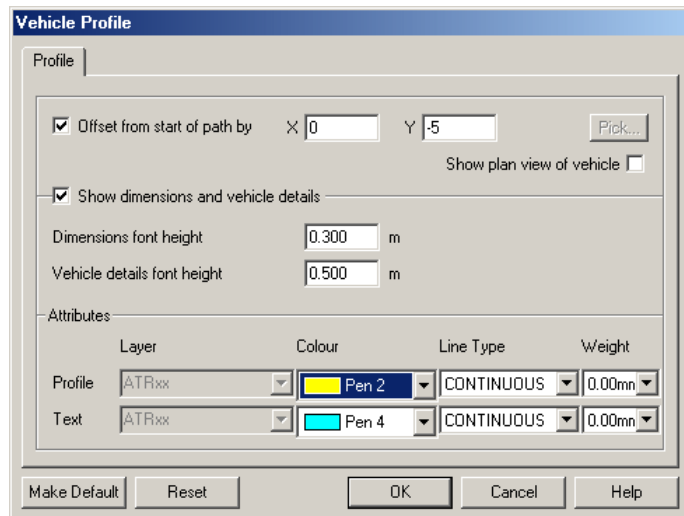


Safety Zone Report offset distances

3. Click on the **Discrete** and/or **Spaced** tabs to specify where on the path the safety zone should be displayed.

## Drawing Settings: Paths: Reports: Profile <sup>(3060)</sup>

1. The Profile report settings control the appearance of the side elevation or profile report.
2. Click on the **Profile** tab.



Vehicle Profile Report dialog

3. The position of the diagram can be set either relative to the start of the path or explicitly. Tick **Offset from start of path** for the former and leave it unticked to fix the position explicitly. To select the location interactively click the **Pick** button, position the report and left click to confirm.
4. If you would rather see a plan view of the vehicle, instead of an elevation, then tick **Show plan view of vehicle**.
5. Tick the **Show dimensions and vehicle details** if you want an annotated diagram. Set the **Dimensions font height** in real world units, i.e. drawing units. If you only want dimensions then set the **Vehicle details font height** to zero. Likewise if you only want vehicle details.
6. If you are using a layering convention then you will not be allowed to specify the report **Layer** (**Level** on MicroStation). Otherwise, you may select from the existing layers or specify a new layer for the report.
7. Select the **Line Type** from the drop down list.
8. Select the **Colour** from the drop down list box. 255 pen colours are listed. To use a colour that is not listed select **Custom** and click on the colour swatch to select from a colour chart.

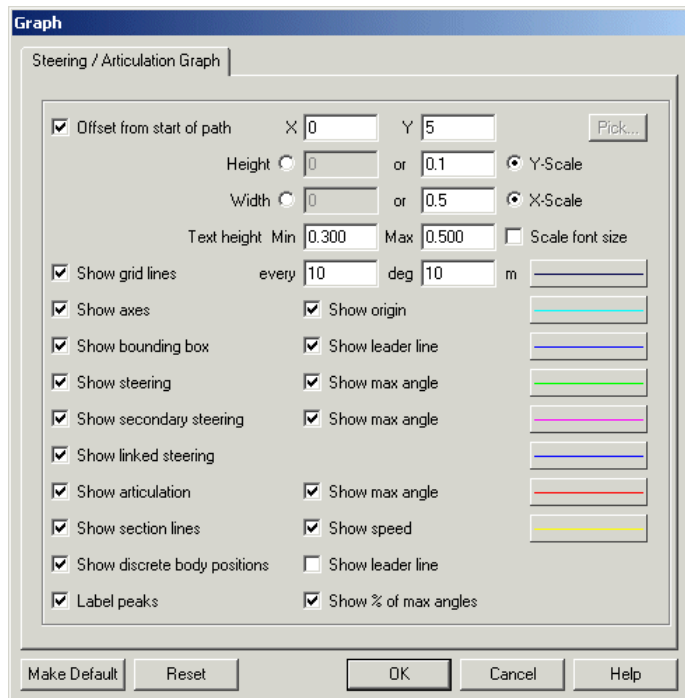
### AutoCAD only

*The pen numbers directly correlate with AutoCAD's pen numbering system (colour indices in later versions). If you select a custom colour that does not correspond to a defined pen colour it will be treated as TrueColor.*

9. Enter a line **Weight** for the report. 0.0mm is the default and forces the thinnest possible line. Wider lines are drawn symmetrically about the centreline. (Not available in AutoCAD R14).

## Drawing Settings: Paths: Reports: Graph <sup>(3070)</sup>

1. This controls the appearance of the steering and articulation angles graph.
2. Click on the **Graph** tab.



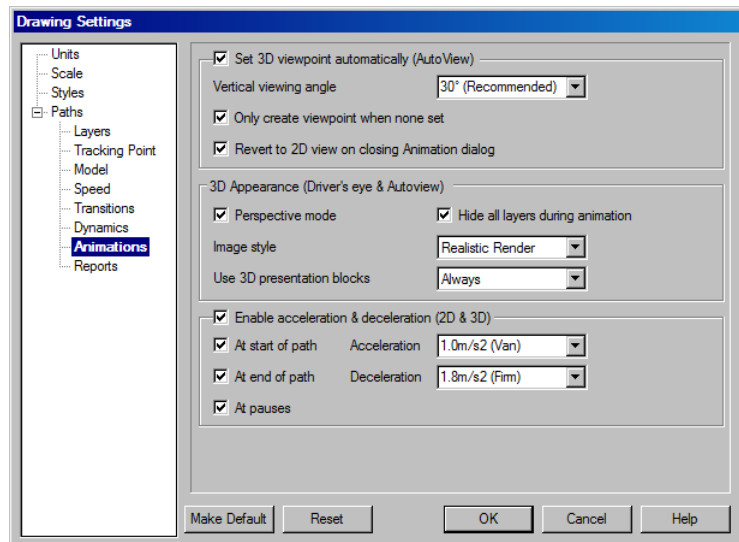
Steering/Articulation Graph Report dialog

3. The position of the diagram can be set either relative to the start of the path or explicitly. Tick **Offset from start of path** for the former and leave it unticked to fix the position explicitly. To select the location interactively click the **Pick** button, position the report and left click to confirm.
4. The height and width can be set explicitly or to be scaled with the rest of the drawing. Select **Height / Width** to set explicitly or **Y-Scale / X-Scale** to allow the graph to scale. In each case you will need to enter suitable values for height and width.
5. Enter **Text height (Min and Max)**. Tick **Scale font size** if you want the text to scale with the rest of the drawing.
6. Tick **Show grid lines** to display a regular background grid. Adjust the spacing in each direction if necessary. Click on the button to change the line attributes.
7. Tick **Show axes** to draw graph axes in a different colour. Tick **Show origin** to draw a circle at the graph origin. Click on the button to change the line attributes.
8. Tick **Show bounding box** to enclose the graph in a box. Tick **Show leader line** to draw a line connecting the bounding box to the path. Note that the position of the connecting line is automatic and cannot be manually controlled. Click on the button to change the line attributes.
9. Tick **Show steering** to plot a graph of the steering angle. Tick **Show max angle** to draw a line representing the maximum steering angle. Click on the button to change the line attributes.

10. Tick **Show secondary steering** to plot a graph of the angles of any manually controlled secondary steered axles. Tick **Show max angle** to draw a line representing the maximum secondary steering angle. Click on the button to change the line attributes.
11. Tick **Show linked steering** to plot a graph of the angles of any linked steered axles. Click on the button to change the line attributes.
12. Tick **Show articulation** to plot a graph of the articulation angle(s). Tick **Show max articulation** to draw a line(s) representing the maximum articulation angle(s). Click on the button to change the line attributes.
13. Tick **Show section lines** to draw vertical lines on the graph at every model change (i.e. change of speed, steering limit, etc). Tick **Show speed** to indicate the speed and direction along the bottom of the graph. Click on the button to change the line attributes.
14. Tick **Show discrete body positions** to draw vertical lines wherever a discrete body outline has been placed on the path. Tick **Show leader line** to draw lines connecting the path to the graph at each discretely placed body outline. Click on the button to change the line attributes.
15. Tick **Label peaks** to annotate the graph to showing the angle at every maximum in each direction. Tick **Show % of max angles** to also show this angle expressed as a percentage of the maximum. Click on the button to change the line attributes.

## Drawing Settings: Paths: Animations (not Roads) <sup>(2150)</sup>

1. The Animations settings control the appearance of animations.
2. Click on the **Animations** tab.



Drawing Settings dialog: Animations tab

3. By default AutoTrack automatically sets the 3D viewing angle. If you would prefer to set the viewing angle manually then untick **Set 3D viewpoint automatically**.
4. The viewing angle is set by default to 30 degrees. If you would prefer a different viewing angle then select an angle from the drop down list or enter an alternative.
5. If you want AutoTrack to only set the viewing angle when you have no view set then tick **Only create viewpoint when none set**.
6. If you want AutoTrack to switch out of 3D mode when you close the animation dialog tick **Revert to 2D view on closing Animation dialog**.
7. Tick **Perspective mode** in the **3D Appearance** section if you want to display a more realistic 3D view. This is especially so when you have a drivers eye viewpoint set.

### Note

*Perspective mode is not available in AutoCAD R14.*

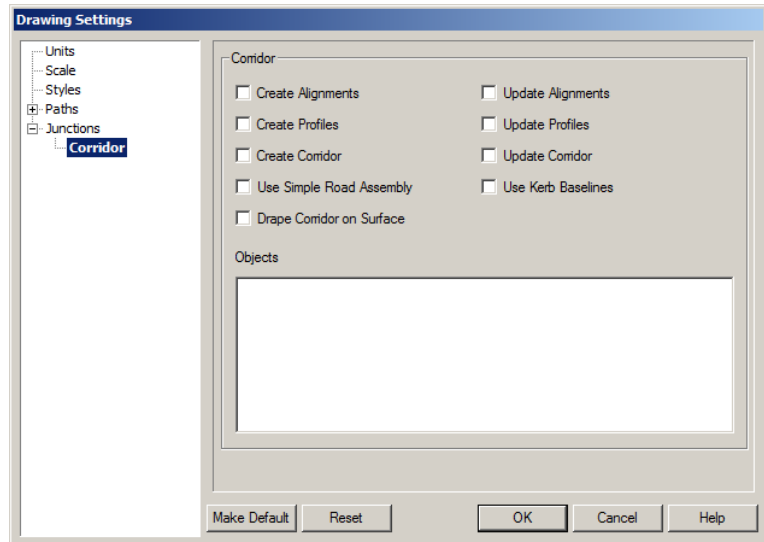
8. The 3D vehicle shape can be displayed in one of several formats. Select your preferred option from the **Image style** drop down list box.
9. Detailed 3D blocks can make the animation jerky so there is an option to control when they are used, if ever. Select when you wish to use 3D blocks from the **Use 3D blocks** drop down list box.
10. Tick **Hide all layers during animation** to hide the 2D swept path while a 3D animation is playing.

11. Tick **Enable acceleration & deceleration** if you want vehicles to slow down and speed up realistically at pauses and changes in design speed.
12. Tick **At start of path**, **At end of path** and / or **At pauses** to control where this feature is applied.
13. Select the required **Acceleration** and **Deceleration** from the drop down combo box or enter your own values.

## Drawing Settings: Junctions: Corridor <sup>(2037)</sup>

If you are running AutoTrack on a supported platform you will have a corridor tab. This defines how the 3D model of the roundabout is built and updated.

1. Expand Junctions in the left hand pane and click Corridor. The Corridor page will appear.



Drawing Settings dialog: Junctions: Corridor

2. The checkboxes in the upper section of the page control how much of the 3D model AutoTrack creates and updates.
3. Tick **Create Alignments** to create horizontal alignments in your CAD system.
4. Tick **Update Alignments** if you want AutoTrack to update the alignments automatically when the geometry changes. This option is only available if AutoTrack created the original alignments, i.e. if **Create Alignments** is ticked.
5. Tick **Create Profiles** to create vertical profiles along the horizontal alignments.
6. Tick **Update Profiles** if you want AutoTrack to update the profiles automatically when the geometry changes. This option is only available if AutoTrack created the original profiles, i.e. if **Create Profiles** is ticked.
7. Tick **Create Corridor** to create a 3D corridor model using default assemblies.
8. Tick **Update Corridor** if you want AutoTrack to update the corridor automatically when the geometry changes. This option is only available if AutoTrack created the original corridor, i.e. if **Create Corridor** is ticked.
9. By default the corridor is built using simple assemblies consisting of just a road surface with no kerbs. This is the case when **Use Simple Road Assembly** is ticked. These assemblies are based upon the Civil 3D **Primary Road Through Intersection** assembly with right and left subassemblies renamed to offside and nearside in accordance with your driving convention.

Untick **Use Simple Road Assembly** to use more complex

assemblies for the entry and exit roads. These assemblies are based upon the Civil 3D **Primary Road Part Section – Daylight Right** (or Left) again with right and left renamed to offside and nearside in accordance with your driving convention.

10. By default the assemblies are inserted on the crown lines and targeted to the nearside kerb and centreline alignments. However under some circumstances it may be desirable to insert them on the nearside kerb alignment. Switch between them with the **Use Kerb Baselines** checkbox.
11. Normally you will probably want to construct the 3D model with calculated profiles; this is the default. To drape the corridor on the surface tick **Drape Corridor on Surface**. With this option enabled, the assemblies take their levels from the original surface profiles rather than the calculated profiles.



# Data Libraries

AutoTrack makes widespread use of data libraries. Libraries contain either predefined objects, such as vehicles, or pre-defined rule bases (standards) such as the parking standards. The basic handling of these data libraries is very similar in all cases.

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## AutoTrack libraries

A number of libraries are provided with the program and these may be used as the basis for your own company libraries. Whatever they relate to, libraries are grouped by nationality so, for example, the UK parking standards are held within a library file called `UK_xxx.ATP`, where `xxx` is the most recent version of AutoTrack that can read it, e.g. `UK_890.ATP`. Additional libraries are available for different markets and can even be created by users themselves. However, to ensure that the data within libraries cannot change arbitrarily, there are restrictions on who can edit them. These restrictions require that users identify themselves if they wish to access a library to make changes. No password is needed to use a library.

### Access to libraries

Access to libraries is restricted using a username / password system such that before a library file can be opened for editing they must enter his or her name and password. Only if the user is authorised will they be allowed to open the file. There are three levels of access:-

#### None

You may list the data within the library but cannot access the details. This is the status of any libraries have not been purchased.

#### Read Only

You may use the library file but may not change them or add new data. All library files are initially opened Read Only.

#### Full Access

You may use, copy, edit, or create new library files and add or edit the users.

All Savoy libraries are Read Only.

Refer to [Viewing an object within a library file or the pool \(Library Explorer dialog\)](#) <sup>(4300)</sup> and [Creating a new library file \(Library File dialog\)](#) <sup>(4320)</sup> for details of how to open standards files and maintain users.

### Access to library objects in the Pool

Once in the Pool, library objects may be edited. Vehicle data that has been used to create an AutoTrack swept path cannot be edited. Other

library data that has been used to create AutoTrack entities can be edited though there may be access restrictions.

**Note**

*If you make a copy of a library object (e.g. a vehicle) in the same library file it's name is prefixed with the words 'Copy of' to distinguish it from the original object.*

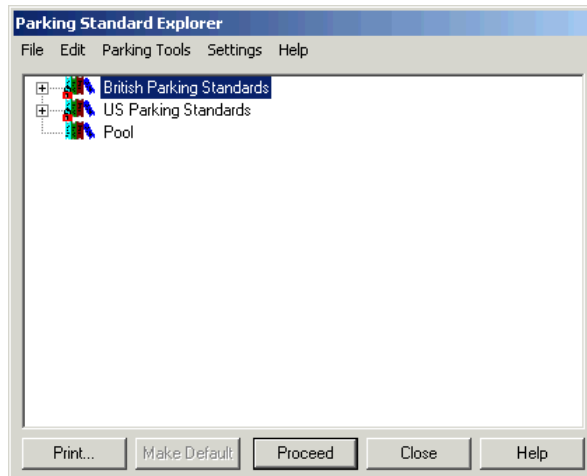
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## Viewing an object within a library file or the pool (Library Explorer dialog) <sup>(4300)</sup>



*Library Explorer button*

1. Click the required **Library Explorer** button from the AutoTrack toolbar. For example, select **Parking Standards Library Explorer** from the AutoTrack, Parking menu or click the **Parking Standards Library Explorer** button on the AutoTrack Parking toolbar. The Parking Standards Library Explorer will appear.



Parking Standards Library Explorer dialog

2. If the library that you require is not loaded then select **Open Library File** from the **File** menu in the Library Explorer, browse to find the library file and click **Open**. A new Library File icon will appear in the Library Explorer with the name of the file beside it. Note that the displayed name is held internally and is not the filename. However, if you load two libraries with the same internal name the filename will be appended in brackets.
3. Click on the + symbol to expand the library file or the pool.
4. Library objects may be listed under different groups. If they are then click the + symbol to expand the required group.
5. Highlight the required object (indicated by a check list icon) and select **Edit** (or **View** if the library file is locked) from the **Edit** menu. The appropriate editing dialog will appear.
6. If you wish to edit a Library Group then highlight it and select **Edit** (or **View** if the library file is locked) from the Edit menu. The Library Group dialog will appear.
7. To create a new library object (vehicle, standard, etc), highlight the parent file or group and select **New {Library Object}**, e.g. **New Parking Standard** from the File menu.
8. To print a library object highlight it and select **Print** from the

File menu or click the **Print** button.

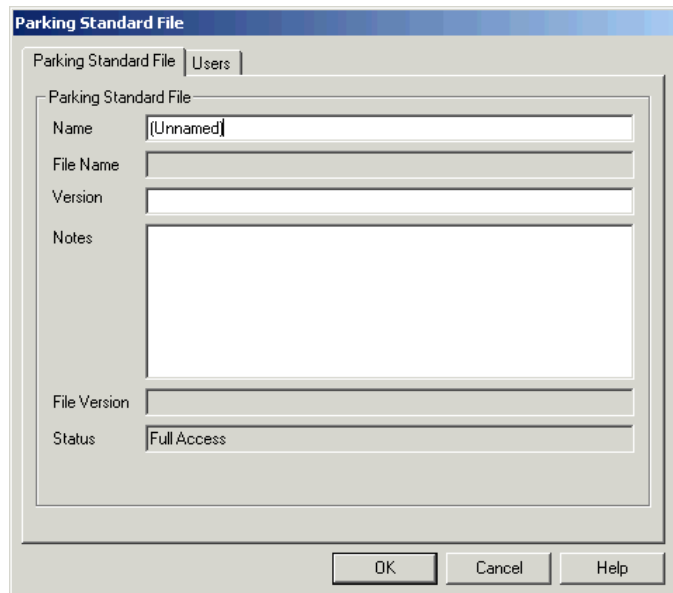
---

## Creating a new library file (Library File dialog) <sup>(4320)</sup>



*Library Explorer button*

1. Click the required **Library Explorer** button from the AutoTrack toolbar. For example, select **Parking Standards Library Explorer** from the AutoTrack, Parking menu or click the **Parking Standards Library Explorer** button on the AutoTrack Parking toolbar. The Parking Standards Library Explorer dialog will appear.
2. Select **New Library File** from the File menu in the Library Explorer. The Library File dialog will appear.



Parking Standards Library File dialog

3. Click the appropriate tab to edit or view the settings.
4. Edit the data as required and click **OK** to confirm when you are satisfied. Click **Cancel** to abort all changes and close the dialog.

### Library File: Library File

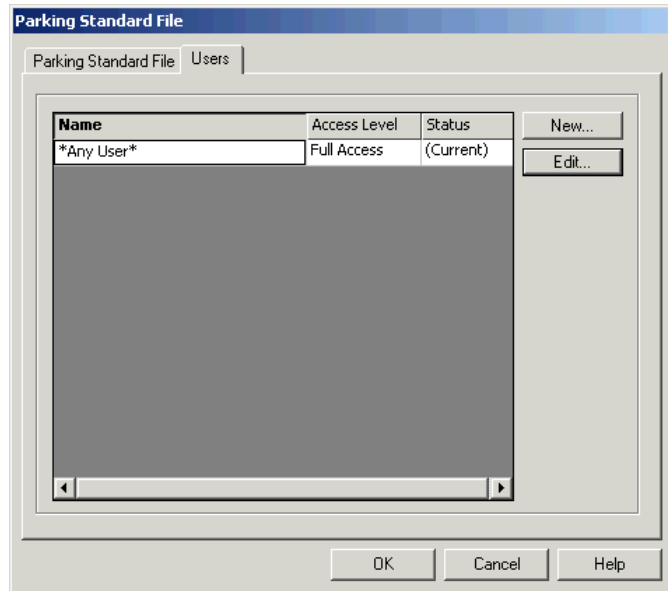
1. Click the Library File tab.
2. Give the library file a meaningful Name.
3. The Version and Notes fields are provided for additional information and may be used at your discretion.
4. The **File Name** is read only and will be filled in when the file is saved.

### Library File: Users

#### Note

*You may only add new users or edit existing users in library files to which you have full access rights.*

1. Click on the **Users** tab.



Library File: Users

- On a new library file all users have full access as indicated by the default entry in the Users table. At least one user in the table must have full access before you may downgrade the default Any User rights.

### ***To add a new user***

- On the Library File dialog click **New**. The New User dialog will appear.

New User dialog

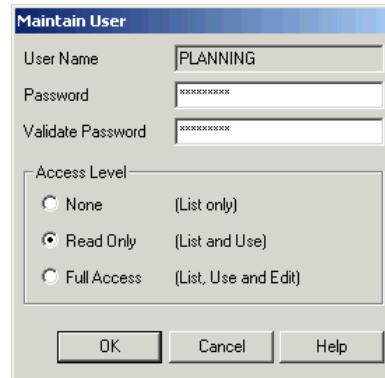
- Enter the new **User Name**. Depending upon how you want to restrict access, this may be a specific person or a department name.
- Enter the **Password** and then repeat it in the **Validate Password** field. This checks that you typed the password correctly. If you do not enter a password the named user will be able to unlock the library file without typing a password.
- Finally set the **Access Level**. We recommend that you add any users that you want to have full access and then downgrade the default Any User to Read Only.
- Even tighter restrictions can be placed by downgrading Any User to No Access and adding Read Only users as required. However, this may prove problematic in practice.

## To edit an existing user (Maintain User dialog)

### Note

You may only add new users or edit existing users in libraries to which you have full access rights.

1. On the Library File dialog highlight the user that you wish to edit and click **Edit**. The Maintain User dialog will appear.

The image shows a 'Maintain User' dialog box. It has a title bar 'Maintain User'. Inside, there are three text input fields: 'User Name' with 'PLANNING' entered, 'Password' with masked characters, and 'Validate Password' with masked characters. Below these is a section titled 'Access Level' containing three radio button options: 'None (List only)', 'Read Only (List and Use)' (which is selected), and 'Full Access (List, Use and Edit)'. At the bottom are three buttons: 'OK', 'Cancel', and 'Help'.

Maintain User dialog

2. Change the **Password** and / or set a new **Access Level** and click **OK** to confirm. If you do not enter a password the named user will be able to unlock the library file without typing a password.
3. Click **Cancel** to abort any changes.

### Note

You cannot delete users; instead you must set their access level to **None**.

---

## Saving a library file



Library Explorer button

1. Select the appropriate Library Explorer button from the AutoTrack menu. For example, select **Parking Standards Library Explorer** from the AutoTrack, Parking menu or click the **Parking Standards Library Explorer** button on the AutoTrack Parking toolbar. The Parking Standards Library Explorer will appear.
2. Highlight the library file that you want to save, right click and select **Save Library File As** from the drop down menu that appears. The Save Library File As dialog will appear.
3. Browse to the required storage directory, enter the filename and click **Save**.
4. If the library file already has a name then you can use **Save Library File**.

---

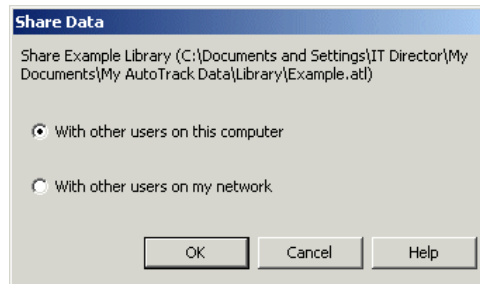
## Sharing a library file (Share Data dialog) <sup>(3590)</sup>



Library Explorer button

1. Select the appropriate Library Explorer button from the AutoTrack menu. For example, select **Parking Standards Library Explorer** from the AutoTrack, Parking menu or click the **Parking Standards Library Explorer** button on the AutoTrack Parking toolbar. The Parking Standards Library Explorer will appear.

2. Highlight the library that you want to share, right click and select **Share Data** from the drop down menu that appears.
3. The Share Data dialog will appear.



Share Data dialog

4. Select who you want to share the library with and click **OK**.

If you select **With other users on this computer** a copy will be placed in the public data directory on your computer.

If you select **With other users on my network** a copy will be placed in the shared data directory (if one is defined).

---

## Copying library objects using drag and drop

Library objects are automatically copied to the Pool when they are used but you may wish to edit a library object before using it or indeed build your own libraries.

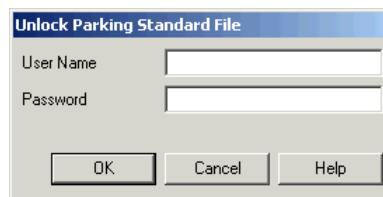
To copy a library object or group to the pool, select it, drag it over the Pool symbol and drop it. If you wish to copy it to another library you will need full access rights in the destination library file. The cursor will change to a no entry symbol to indicate areas where you may not drop the object.

You can also make copies of objects within library files in the same way; in this case the name of the object is prefixed with the words 'Copy of ', to distinguish it from the original.

---

## Unlocking a library file (Unlock Library File dialog) <sup>(3555)</sup>

1. In the Library Explorer, highlight the library file that you want to unlock, right click and select **Unlock Library File** from the drop down menu that appears. If a password has been set for the library file, the Unlock Library File dialog will appear. Otherwise, the library file will be unlocked and you should refer to step 3.



Unlock Library File dialog

2. Enter your **User Name** and **Password** and click **OK**.
3. You will be granted whatever rights you have within the library file. Thus, if you have full access rights within the current library

file then you will be able to change values in the unlocked libraries; if, on the other hand you only have read only rights then you will only be able to use and copy the library data.

---

## Creating a new group



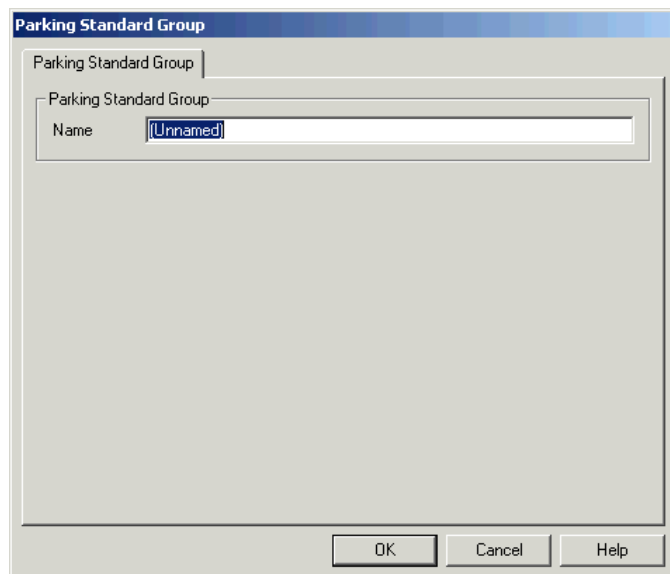
*Library Explorer button*

1. Select the appropriate Library Explorer button from the AutoTrack menu. For example, select **Parking Standards Library Explorer** from the AutoTrack, Parking menu or click the **Parking Standards Library Explorer** button on the AutoTrack Parking toolbar. The Parking Standards Library Explorer will appear.
2. Highlight the library file that you want to add a group to.
3. Right click and select **New, Library Group** from the menu. The [Parking Standard Group dialog](#) will appear.
4. Edit the details and click **OK** to confirm.

---

## Library Group dialog (4310)

1. The Library Group dialog lists the library group details.



Parking Standards Library Group dialog

2. Edit the **Name** and click **OK** to confirm.

---

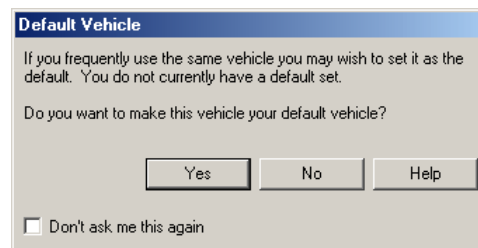
## Selecting library data

### To set a default object within a library

1. Highlight the object that you want to set as your default and click the **Make Default** button.
2. The next time you request data from this library, this object will be used.

### Default Data dialog <sup>(4690)</sup>

1. AutoTrack allows you to define default library data, i.e. data that will be used every time you use that library unless you actively select an alternative. This can be very useful if you regularly use the same library data (e.g. vehicle). If you select an item from a library to create an AutoTrack entity, and you do not have default data set for that library, the Default Data dialog will appear.



Default Data dialog

2. If you select **Yes** then this data will be selected automatically next time you use this library. If you select **No** then you will be asked this again the next time you select data from this library in similar circumstances.
3. If you don't want to be asked again then tick **Don't ask me this again**.

---

## Viewing or editing library files

Library files supplied by Savoy can only be edited once they have been copied to the Pool. Thereafter, any changes you make to the library data will affect all AutoTrack entities that use it. Note that vehicles cannot be edited once they have been used in a path.

You may edit libraries that you create. However, in order to prevent accidental changes, they will be locked when you close AutoTrack and you will need to unlock them to make any changes.

### To edit a library





*Library Explorer button*

1. Select the appropriate Library Explorer button from the AutoTrack menu. For example, select **Parking Standards Library Explorer** from the AutoTrack, Parking menu or click the **Parking Standards Library Explorer** button on the AutoTrack Parking toolbar. The Parking Standards Library Explorer dialog will appear.



Parking Standards Library Explorer dialog

2. If the library that you require is not loaded then select **Open Library** from the **File** menu in the Library Explorer, browse to find the library file and click **Open**. A new library icon will appear with the name of the Library beside it. Note that the displayed name is held internally and is not the filename. However, if you load two libraries with the same internal name the filename will be appended in brackets.
3. Click on the + symbol to expand the library or the pool.
4. Click the + symbol adjacent to the required group if necessary.
5. Highlight the required library (indicated by a check sheet symbol dependant) and select **Edit** (or **View** if the Library is locked) from the Edit menu. The Library dialog will appear.
6. If you wish to edit a library group then highlight it and select **Edit** (or **View** if the library is locked) from the **Edit** menu in the Library Explorer. The Library Group dialog will appear.
7. To create a new library object highlight the parent file or group, right click and select **New Library Object** from the menu that appears.

# Templates

AutoTrack can generate templates for simple right or left turning manoeuvres.

---

## Generating turn templates

AutoTrack Templates generates turn templates for printing only, Templates Pro additionally allows you to save them or insert them into a drawing.

### To generate a turn template



*Generate Turn Template  
button*

1. If you are using the stand-alone standard Templates version then when you run the software you will automatically be placed on the first page of the Template Wizard.
2. If you running any other version then you should select **Generate Turn Template** from the AutoTrack menu or click the **Generate Turn Template** button on the AutoTrack toolbar. The Template Wizard will appear (see [The Template Wizard](#)).

---

## The Template Wizard

The Template Wizard allows you to generate turn templates for any of the hundreds of supplied vehicles. It will even allow you to generate templates for user defined vehicles although users of the basic product should be aware that vehicle editing facilities are not included.

The Template Generator uses fixed report settings (colour, linetype, etc) that the user cannot change.

DXF files produced by the Template Generator are created in AutoCAD R14 format, i.e. that they do not use the LWPOLYLINE entity.

## Template Wizard: Type <sup>(6500)</sup>

1. The first page of the Template Wizard lets you specify the type of template.

The screenshot shows the 'Template Wizard: Type' dialog box. It has three main sections, each with a radio button selection:

- Printed template(s)** (selected): Includes fields for 'Printer' (Samsung 7000 Series PCL5e), 'Paper' (A4 Sheet, 210 by 297 millimeters), and 'Scale' (Auto Select). A 'Change...' button is next to the printer field.
- DXF file**: Includes a 'File Name' field and a '1 Drawing Unit represents' field set to 1 metres.
- Block insert into current drawing**: Includes a '1 Drawing Unit represents' field set to 1 metres.

At the bottom of the dialog are five buttons: '< Back', 'Next >', 'Finish', 'Cancel', and 'Help'.

Template Wizard: Type tab

2. Select the type of template that you wish to generate, **Printed Template(s)**, **DXF file** or **Block Insert (into the current drawing)**. Note that only the printing option is available to users of the standard Templates product.
3. **Printed Templates**

Select the printer if necessary using the **Change** button.

Set the **Scale**. The option **(Auto Select)** will pick the largest sensible scale taking into account the manoeuvre and paper size. The option **(Scale to Fit Paper)** will produce the largest true to scale template that will fit on the paper.

### DXF File (not standard Templates version)

Enter the file name using the **Browse** button if necessary.

Set the scale of the template, e.g. if you normally prepare drawings in millimetres then set the scale to 1 drawing unit represents 1 millimetre. If you use various drawing units then either generate templates in each unit or simply scale the block upon insert into the drawing.

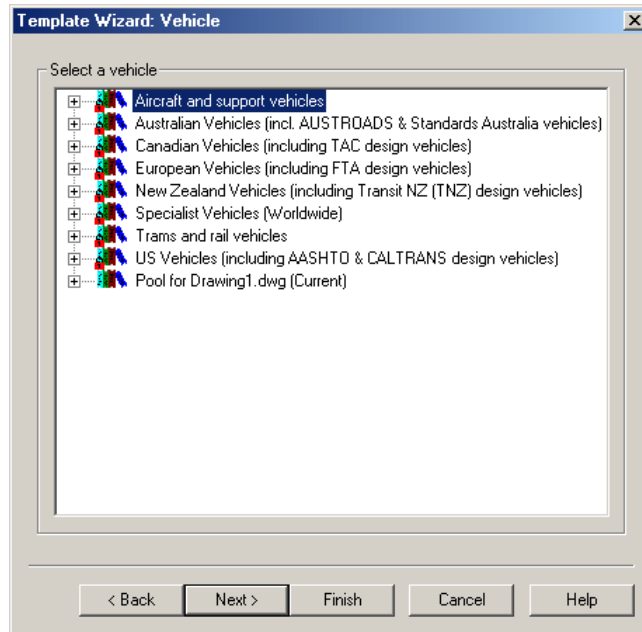
### Block insert (not standard Templates version)

Set the scale of the template, e.g. if you are inserting the block into a drawing prepared in millimetres then set the scale to 1 drawing unit represents 1 millimetre.

4. Click **Next** to move the next page.

## Template Wizard: Vehicle <sup>(6510)</sup>

1. The Vehicle page lets you select the vehicle(s) for your templates.

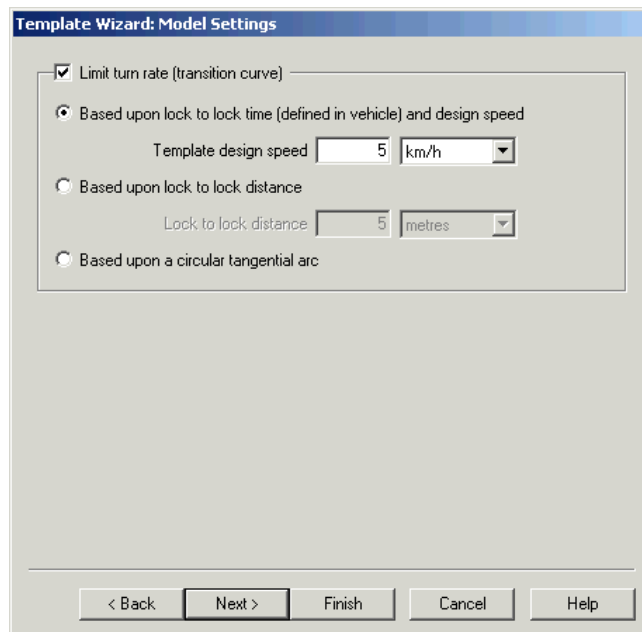


Template Wizard: Vehicle tab

2. Select the vehicle you wish to generate the template for, clicking on the + symbol to expand a library or group and – to collapse it. Note that printed templates can be generated for an entire group or library at a time.
3. If the selected vehicle cannot perform the turn requested, because it has very strict articulation limits for example, the template will only show the part that could be negotiated.
4. Click **Next** to move to the next page.

## Template Wizard: Model Settings <sup>(6515)</sup>

1. The Model Settings page lets you control the turn transition.



The screenshot shows a dialog box titled "Template Wizard: Model Settings". It contains a section titled "Limit turn rate (transition curve)" which is checked. Below this, there are three radio button options: "Based upon lock to lock time (defined in vehicle) and design speed" (selected), "Based upon lock to lock distance", and "Based upon a circular tangential arc". The first option has a sub-field "Template design speed" with a value of "5" and a unit dropdown set to "km/h". The second option has a sub-field "Lock to lock distance" with a value of "5" and a unit dropdown set to "metres". At the bottom of the dialog are five buttons: "< Back", "Next >", "Finish", "Cancel", and "Help".

Template Wizard: Model Settings

2. Tick **Limit turn rate** if you want to include a transition curve into the turn. If you leave this unticked the vehicle will be able to turn instantaneously. Note that there are various official sources of printed templates available, e.g. the AASHTO Green Book. If you wish to generate templates that match these you will need to select the correct transition curve. In the case of the AASHTO standard you should set the transition to **Based upon a circular tangential arc**.

### Note

*These settings apply only to template generation and do not affect other drive modes.*

## Template Wizard: Turn Angles <sup>(6520)</sup>

1. The Turn Details page lets you define the content of the templates.

**Template Wizard: Turn Details**

Turn radius:

☒ Turn as tight as possible

☐ Turn on a fixed radius of  metres

Turn angles (tick all required):

<input checked="" type="checkbox"/> 30	<input checked="" type="checkbox"/> 150	<input type="checkbox"/> 270
<input checked="" type="checkbox"/> 60	<input checked="" type="checkbox"/> 180	<input type="checkbox"/> 300
<input checked="" type="checkbox"/> 90	<input type="checkbox"/> 210	<input type="checkbox"/> 330
<input checked="" type="checkbox"/> 120	<input type="checkbox"/> 240	<input type="checkbox"/> 360

Overturns:

☐ Side overturn distance  metres

☐ Exit overturn distance  metres

Max. overturn angle

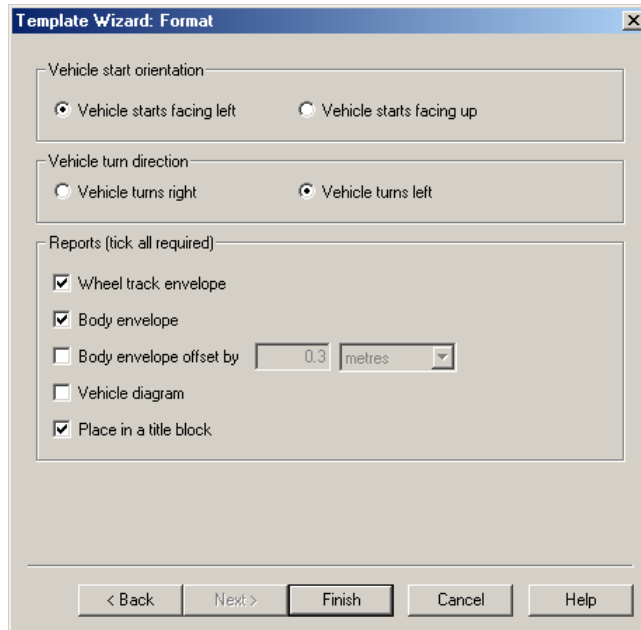
< Back   Next >   Finish   Cancel   Help

Template Wizard: Turn Details tab

2. By default the vehicle will turn as tight as it can. If you want the vehicle to turn on a specific radius, around a roundabout for example, then select **Turn at a fixed radius** and enter the inner, outer or centreline body or chassis radius.
3. To specify the **Turn angles** you require tick a box and enter the angle in the box provided.
4. The **Angles** button toggles through various combinations of angles. You may disable as many or as few of the angles.
5. You may also specify overturns. Tick **Side overturn** or **Exit overturn** and enter the deviation distance from the normal path. The **Max overturn** angle controls the severity of the overturn by limiting the angle by which the vehicle may deviate from the optimum path.
6. Click **Next** to move to the next page.

## Template Wizard: Format <sup>(6530)</sup>

1. The Format page lets you specify the presentation of your template(s).



Template Wizard: Format tab

2. Select the **Vehicle start orientation**. Note that if you are inserting the template into a drawing you will be able to rotate it as it is inserted.
3. Select the **Vehicle turn direction**. If you are generating printed templates then this may be affected by which side of the road you drive on.
4. Tick **Wheel track envelope** if kerbs are likely to be critical and / or **Body envelope** if walls or other high level obstacles are likely to be critical. Tick **Offset body envelope** to show an envelope with clearance margin. You can adjust the offset distance.

### Note

*You must select at least one of these reports but you may select more than one.*

5. Tick **Add vehicle diagram** to show a dimensioned image of the vehicle alongside the template. This is particularly useful on the printed templates.
6. If you are generating printed templates then you may wish to tick **Place in a title block**. This will add a title block with the vehicle name and other details.
7. Click **Finish** to generate the template.
8. If you are inserting a block then move it into position and confirm by left clicking. You may use the Rotate command to adjust the orientation.





# Swept Paths: Creating paths

There are six drive modes in the full version of AutoTrack; AutoDrive Arc, AutoDrive Bearing, Manual Drive, Follow, Script and Vertical Clearance. Each may be accessed either directly from the toolbar or the drop down menu. A further drive mode allows you to insert parked vehicles.

AutoTrack Lite has Manual Drive, Follow and Script but does not have AutoDrive Arc, AutoDrive Bearing, Vertical Clearance or Dynamic Editing. It does however have the Park mode.

AutoTrack Rail has only one drive mode, namely Guided Drive.

## AutoDrive (Roads only)

AutoDrive operates in two modes, Arc and Bearing. Both are controlled via a floating dialog which allows the user to adjust various parameters.

In Arc mode AutoTrack calculates a path, consisting of circular arcs, through target points specified by the user. In doing so it automatically generates any transitions necessary between segments.

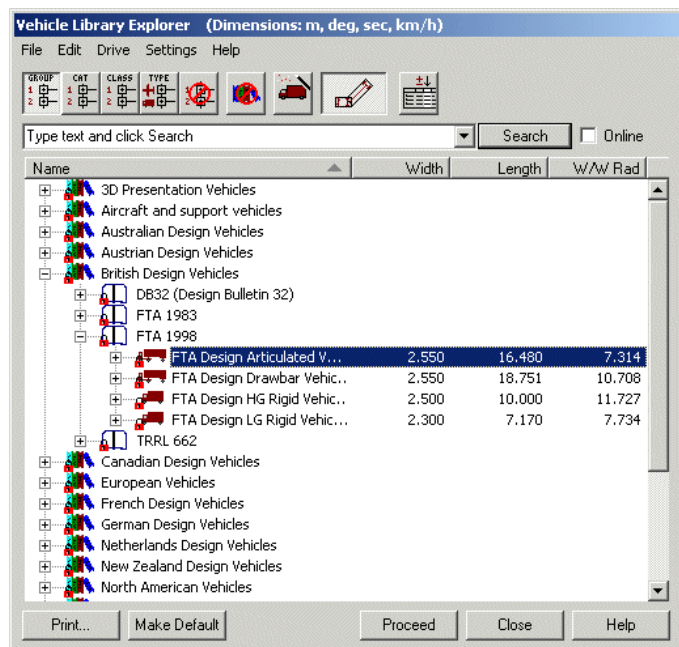
In Bearing mode AutoTrack turns the vehicle as quickly as possible subject to the allowable lock rate **until the steered wheels are on a bearing through the target point** and then continues on that bearing **until the selected path point reaches the target**.

### To use AutoDrive in Arc mode



AutoDrive Arc button

1. Select **AutoDrive Arc** from the AutoTrack drop down menu or click the **AutoDrive Arc** button on the AutoTrack toolbar.
2. If you have a default vehicle set up then AutoDrive will use this vehicle and you should go to step 6. If you want to use a different vehicle then right click now and refer to [Changing your vehicle](#). Otherwise...
3. If you have a path pre-selected then AutoDrive will use the current vehicle and position and you should go to step 7. Otherwise...
4. The Library Explorer will appear for you to select a vehicle.



Library Explorer dialog

5. Select a vehicle and click **Proceed**. For help on how to select a vehicle refer to [Selecting a vehicle to drive](#) later in this section.
6. Your chosen vehicle will be displayed and can be positioned using the mouse. Position and orient your vehicle and click **Proceed**. For help on how to position a vehicle refer to [Positioning a vehicle interactively](#) later in this section.

#### Note

*If you have a simple body defined (i.e. of report type Body Outline (Plan)) AutoTrack will use this, otherwise it will use the detailed plan of type Body Detail (Plan).*

7. Drive the vehicle (see below) and right click when finished.

### To drive forwards on an arc

1. Move the cursor in front of the vehicle and pause. A ghosted image will show the path the vehicle will travel from the last position through the target point (the cursor).
2. If you cannot see a vehicle you may have your drawing units set incorrectly.
3. A straight red line connecting the cursor to the last position indicates that you are requesting a manoeuvre that cannot be performed and the error will be displayed in the bottom left corner of the AutoCAD status bar. Try moving the cursor to perform a less severe turn.
4. Move the cursor until the vehicle is in the desired position and left click to confirm. A vehicle outline will be drawn at the selected location and you may now repeat the process for the next position.
5. The AutoDrive options dialog allows you to specify a minimum radius and to change settings for the current turn. See below.
6. To turn tight and then travel straight tick **Drive onto bearing**.

### To drive backwards on an arc

1. Move the cursor behind the vehicle and pause. A ghosted image will show the path the vehicle will travel from the last position through the target point (the cursor).
2. A straight red line connecting the cursor to the last position indicates that you are requesting a manoeuvre that cannot be performed and the error will be displayed in the bottom left corner of the AutoCAD status bar. Try moving the cursor to perform a less severe turn.
3. Move the cursor until the vehicle is in the desired position and left click to confirm. A vehicle outline will be drawn at the selected location and you may now repeat the process for the next position.

### To use AutoDrive in Bearing mode

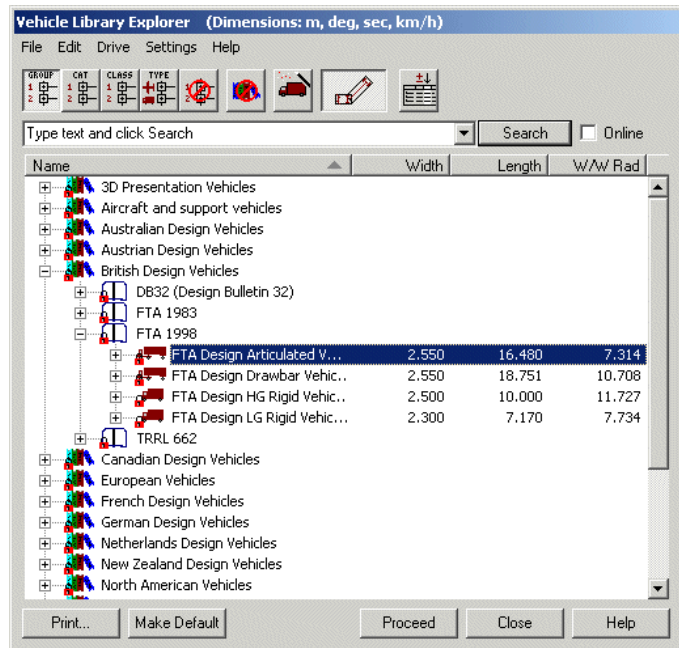


*AutoDrive Bearing button*

1. Select **AutoDrive Bearing** from the AutoTrack drop down menu or click the **AutoDrive Bearing** button on the AutoTrack toolbar. The default turn angle is 90 degrees. Note that **on AutoCAD platforms only** AutoDrive Bearing has a flyout toolbar listing standard turn angles of 30, 45, 60, 90, 120, 135, 150 and 180 degrees.
2. If you have a default vehicle set up then AutoDrive will use this vehicle and you should go to step 6. If you want to use a different vehicle then right click now and refer to [Changing your vehicle](#).

Otherwise...

3. If you have a path pre-selected then AutoDrive will use the current vehicle and position and you should go to step 7. Otherwise...
4. The Library Explorer will appear for you to select a vehicle.

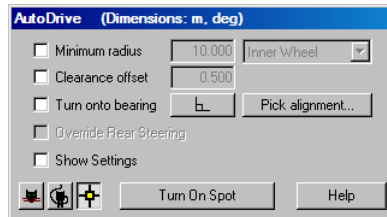


Library Explorer dialog

5. Select a vehicle and click **Proceed**. For help on how to select a vehicle refer to [Selecting a vehicle to drive](#) later in this section.
6. Your chosen vehicle will be displayed and can be positioned using the mouse. Also displayed will be the AutoDrive Bearing options dialog. Position and orient your vehicle and click **Proceed**. For help on how to position a vehicle refer to [Positioning a vehicle interactively](#) later in this section.
7. Move the cursor in front of the vehicle and pause. A ghosted image will show the path the vehicle will travel from the last position through the target point (the cursor). Notice how the path is different from AutoDrive Arc.
8. Move the cursor until the vehicle is in the desired position and left click to confirm. A vehicle outline will be drawn at the selected location and you may now repeat the process for the next position.
9. You can delete the last selected position (target point) by simply left clicking with the cursor inside the wheelbase of the last drawn vehicle outline. This can be repeated back to the start of the path.
10. The AutoDrive options dialog allows you to specify turn angle and or radius and to change settings.
11. To drive arcs instead of straight segments untick **Drive onto bearing** in the AutoDrive options dialog.

## AutoDrive options (5110)

1. The AutoDrive dialog appears when you use either of the AutoDrive modes. It allows you not only to set turning criteria but also to switch between arc and bearing mode.



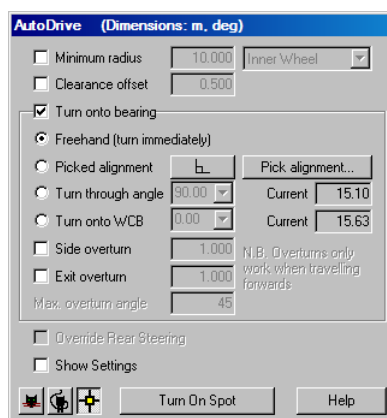
AutoDrive dialog (Arc mode)

2. To limit the turning radius tick **Minimum radius**, enter a value in the box and press <Tab> or <Enter>. You can select Inner Wheel or Outer Wheel to limit the inside or outside wheel tracking radius respectively, Inner Body or Outer Body to limit the inner or outer body envelope radius or Centreline to limit the radius at the centre of the steered axle.

### Note

*Vehicle turning limitations still take precedence over the value in this field.*

3. To show a clearance zone around the vehicle tick **Clearance Offset**. You may edit the offset value. The clearance envelope applies to both body and chassis, i.e. an offset envelope will be displayed outside the body static envelope and another outside the chassis static envelope. If you want to use a clearance envelope during driving then you should refer to Settings, AutoDrive.
4. To switch to bearing mode tick **Turn onto bearing** and to switch back untick it. When ticked the dialog expands to show extra fields.

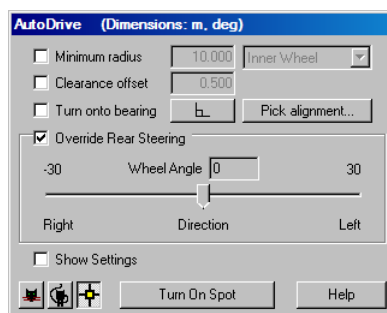


AutoDrive dialog (Bearing mode)

5. Select **Freehand turn** (the default) to turn immediately and drive straight to the cursor. In this case the vehicle still turns as tightly as current constraints allow but there is never any straight section preceding the turn.
6. Select **Picked alignment** to specify the alignment by picking a line or line segment from the drawing. You can align the

vehicle parallel to the selected line or depress the **Perpendicular To** button to align the vehicle perpendicular to the selected line. Click the **Pick alignment** button to pick the alignment.

7. Select **Turn through angle** to turn as late as possible through a fixed angle. Select the angle from the drop down list or enter a value. The vehicle will turn as tightly as possible, subject to current constraints, through the specified angle and then drive straight to the cursor. As you move the cursor away from the last target point the sections preceding and following the turn adjust accordingly.
8. After the next target point has been picked following selection of a non-freehand bearing mode the bearing mode will switch automatically back to freehand mode.
9. Select **Turn onto WCB** (whole circle bearing) to turn as late as possible onto a fixed heading. Select the heading from the drop down list or enter a value. Again, the vehicle will turn as tightly as present constraints allow onto the specified heading and then straighten and drive to the cursor.
10. The current angle and bearing are displayed in the adjacent read-only boxes.
11. Select **Side overturn** to start the turn with opposite lock thereby reducing trailing axle cut-in. By adjusting the side overturn distance you can alter the size of the deviation.
12. Select **Exit overturn** to continue the turn beyond the required exit angle prior to turning back onto the required exit angle. As with side overturn this reduces trailing axle cut-in.
13. Adjust the **Max overturn angle** to alter the severity of the overturn. This is the maximum opposite lock bearing deviation. For example, if the vehicle commences a right turn from straight ahead on a bearing of 0 deg, a max overturn angle of 30 deg would allow the vehicle to turn left onto a maximum bearing of -30 before turning back. Note that the maximum overturn angle may not be reached when using smaller overturn distances.
14. If the vehicle has manually controllable secondary steering then to switch it on tick **Override rear steering**. Unlick it to switch it off again. You can also do this by clicking the mouse wheel. When secondary steering is switched on the dialog expands to show more fields.

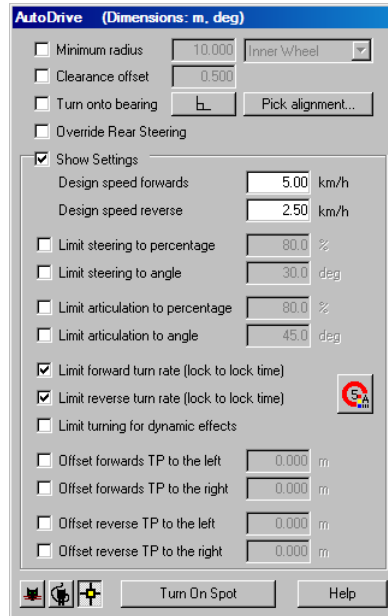


AutoDrive dialog (Secondary Steering)

15. The secondary steering may involve adjusting a linkage ratio or the wheel angle directly. Either way the slider shows the range of values. The current value is displayed in a box labeled either **Linkage Ratio** or **Wheel Angle** depending

according to the vehicle definition.

16. The easiest way to adjust the secondary steering value is to use the mouse wheel but you can move the slider if you prefer.
17. To check what other constraints are current tick **Show Settings**. When ticked the dialog expands to show the main settings.



AutoDrive dialog (Show Settings)



Forwards and Reverse Predictive Turning buttons



SnapDrive button

18. Depress the **Forward Predictive Turning** button to switch on the Predictive Turning envelope for forward manoeuvres or the **Reverse Predictive Turning** button for the same in reverse. You can change the settings for these in the AutoDrive settings. Note that for articulated vehicles the predictive turning envelopes are based upon a percentage (set in AutoDrive settings) of the tightest turn possible without the vehicle over-articulating. Thus it may be possible to turn tighter than the 100% envelope for a short distance.
19. Depress the **SnapDrive** button to enable snapping to AutoTrack objects. The path will now snap to parking bays and valid routes on roundabouts.

#### Tip

You can toggle the SnapDrive setting at drive time by holding the <Ctrl> key down.

20. Depress the **Turn on spot** button to disable any turn transitions for just the current step. The steering will turn instantaneously at the start of the step only. As soon as you click the next target position the option will be reset.
21. To limit the steering tick **Limit steering to percentage** or **Limit steering to angle** and edit the value if required. Note that limiting the steering by percentage is vehicle independent whereas limiting to a specific angle is not.
22. To limit the articulation angles tick **Limit articulation to percentage** or **Limit articulation to angle** and edit the value if required. Note that limiting the articulation angles by

percentage is vehicle independent whereas limiting by angle is not.

23. To allow steering to be turned whilst the vehicle is stationary untick **Limit forward turn rate** or **Limit reverse turn rate**. When these limits are disabled (unticked) you should be able to see the steering pointer (if displayed) at the last picked position changing as you move the cursor to change the current position.
24. If you are modeling higher speed manoeuvres (above about 15kph) then you may wish to tick **Dynamic effects**. This limits the turn radius to allow for passenger comfort. See [Drawing Settings: Paths: Transitions \(Roads & Airports\)](#) <sup>(2085)</sup> for more details).
25. Tick **Offset forwards TP** (Tracking Point) or **Offset reverse TP** to offset the tracking point.
26. If you need to modify a value that is not listed click the **Current Model** button.



---

## Manual Drive (not Rail)

Manual Drive allows you to control the vehicle interactively much like the real vehicle, albeit with a different viewpoint and controls.

### To use Manual Drive



Manual Drive button

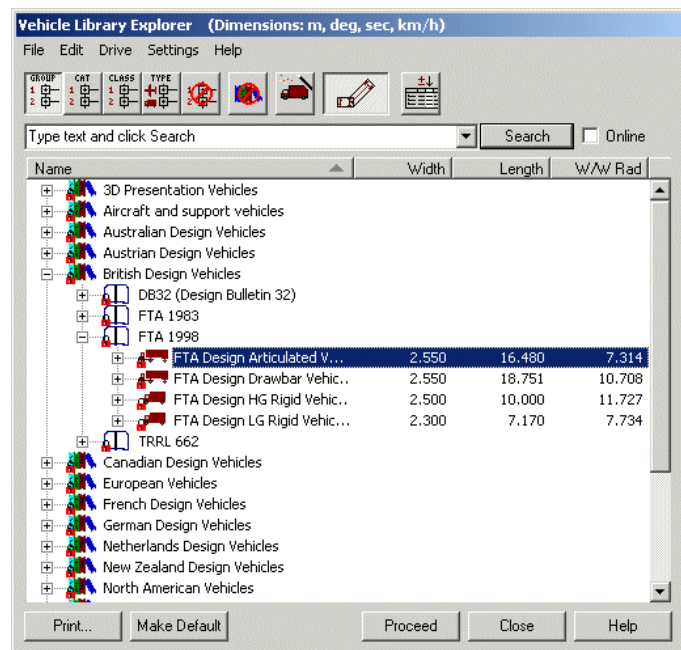
1. Select Manual Drive from the AutoTrack drop down menu or click the **Manual Drive** button on the AutoTrack toolbar.
2. If you have a default vehicle set up then Manual Drive will use this vehicle and you should go to step 6. If you want to use a different vehicle then right click now and refer to [Changing your vehicle](#).

Otherwise...

3. If you have a path pre-selected then Manual Drive will use the current vehicle and position and you should go to step 7.

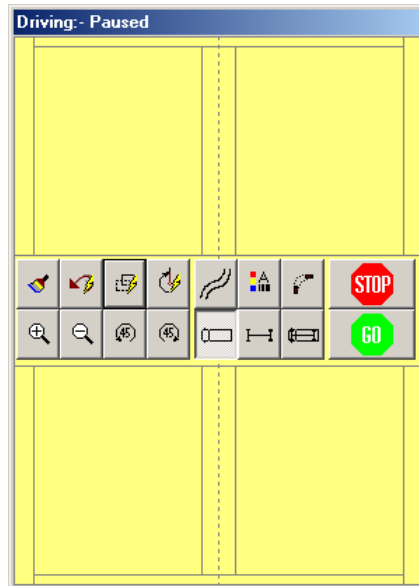
Otherwise...

4. The Library Explorer will appear for you to select a vehicle.



Library Explorer dialog

5. Select a vehicle and click **Proceed**. For help on how to select a vehicle refer to [Selecting a vehicle to drive](#) later in this section.
6. Position and orient your vehicle and click **Proceed**. For help on how to position a vehicle refer to [Positioning a vehicle interactively](#) later in this section.
7. The Control Overlay will appear.



Manual Drive Control Overlay

8. By default the overlay will appear in the bottom right corner of the screen. If you find this awkward the location and size of the overlay can be changed in Manual Drive Settings.

## To start driving (Control Overlay) <sup>(6020)</sup>

If you are using the default button functionality...



Go button

1. Click the **Go** button. The buttons will disappear and the cursor now represents requested steering angle and rate at which the path is generated (not design speed).
2. The vehicle will start to move when you move the cursor out of the stop zone. Notice how the caption bar changes from Driving: PAUSED to Driving: Forwards or Driving: Reverse to reflect the direction of travel. Click the left button again when you wish to pause.
3. Move the cursor between the two centre horizontal bands to stop moving, above the bands to go progressively faster forwards and below the bands to go progressively faster in reverse.
4. Move the cursor left to turn the steered wheels left and vice versa. Practice reversing and driving rear steered vehicles until you feel comfortable with the steering response.
5. A dotted line representing the current wheel angle is displayed on the overlay. If you have steering rate limits enabled you may notice that it lags behind the requested steering angle represented by the cursor. The degree to which it lags behind depends upon the steering rate criteria. The actual wheel angle line will snap the centre of the full lock and straight ahead zones.
6. Click anywhere on the overlay to pause the vehicle and redisplay the buttons.

If you have specified hold down button to drive...

1. Move the cursor into the zone above or below the buttons and hold down the left mouse button. The buttons will disappear and the cursor now represents requested steering angle and rate at which the path is generated (not design speed).
2. As long as you hold the button down the overlay buttons will not be visible and the vehicle will start to move as you move the cursor out of the stop zone. Notice how the caption bar changes from Driving: PAUSED to Driving: Forwards or Driving: Reverse to reflect the direction of travel. As soon as you release the left mouse button the vehicle will stop moving and the overlay buttons will reappear.
3. Move the cursor between the two centre horizontal bands to stop moving, above the bands to go progressively faster forwards and below the bands to go progressively faster in reverse.
4. Move the cursor left to turn the steered wheels left and vice versa. Practice reversing and driving rear steered vehicles until you feel comfortable with the steering response.
5. A dotted line representing the current wheel angle is displayed on the overlay. If you have steering rate limits enabled you may notice that it lags behind the requested steering angle represented by the cursor. The degree to which it lags behind depends upon the steering rate criteria. The actual wheel angle line will snap the centre of the full lock and straight ahead zones.
6. Release the mouse button to pause the vehicle and redisplay the buttons.

**Note**

*If you have configured your mouse for left-handed use or selected left hand drive in the Manual Drive settings then you will need to hold down the right mouse button to drive.*

## To pause driving

If you are using the default button functionality....

1. Right click. The overlay buttons will appear.

If you have specified hold down button to drive...

1. Release the left mouse button. The overlay buttons will appear.

**Note**

*If you have swapped the mouse button functionality, either in the Windows Control Panel or in the Manual Drive settings then you will need to click (or release) the right mouse button.*

## To adjust the view

1. For your convenience the View toolbar functions are repeated on this dialog. For help in adjusting the view refer to [Adjusting the view](#).

## To undo part of the path



*Auto Undo button*

1. If the overlay buttons are not displayed pause driving to display them.
2. Click the **Auto Undo** button.
3. The path will be shortened by the Auto Undo distance. The Auto Undo distance is 2.5m by default but can be modified if a different value is more appropriate. For details of how to modify the Auto Undo distance refer to [System Settings: Paths: Manual Drive \(Roads only\)](#).

## To redraw the path and update the reports



1. If the overlay buttons are not displayed pause driving to display them.
2. Click the **Redraw** button.
3. The path and all reports will be redrawn.

## To show or hide the vehicle trail



*Show Trails button*

1. If the overlay buttons are not displayed pause driving to display them.
2. Click the **Show Trails** button to toggle displaying and hiding vehicle trails as you drive. If the button is depressed trails will be displayed.

## To edit the path properties



*Properties button*

1. If the overlay buttons are not displayed pause driving to display them.
2. Click the **Properties** button.
3. The Path Properties dialog will appear. Edit the properties and click **OK** to confirm and resume driving.

## To edit the path reports



*Reports button*

1. If the overlay buttons are not displayed pause driving to display them.
2. Click the **Reports** button.
3. The path properties dialog will appear with the Reports tab foremost. Edit the reports and click **OK** to confirm and resume driving.

## To terminate the current path



*Stop button*

1. If the overlay buttons are not displayed pause driving to display them.
2. Click the **Stop** button.
3. The control overlay will disappear.

---

## Follow (not Rail)

Follow allows you to track a vehicle along a predefined polyline or spline and is useful if the path that your vehicle will take is well defined, e.g. aircraft manoeuvring on airport taxiways. It can be used in conjunction with the other drive modes.

### To use Follow



*Follow button*

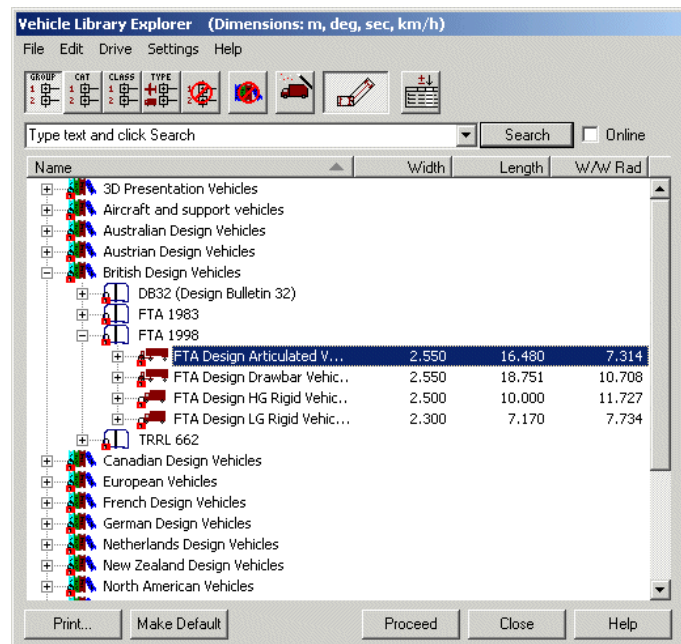
1. Select **Follow** from the AutoTrack drop down menu or click the **Follow** button on the AutoTrack toolbar.
2. If you have a default vehicle set up then Follow will use this vehicle and you should go to step 6. If you want to use a different vehicle then right click now and refer to [Changing your vehicle](#).

Otherwise...

3. If you have a path pre-selected then Follow will use the current vehicle and position and you should go to step 6.

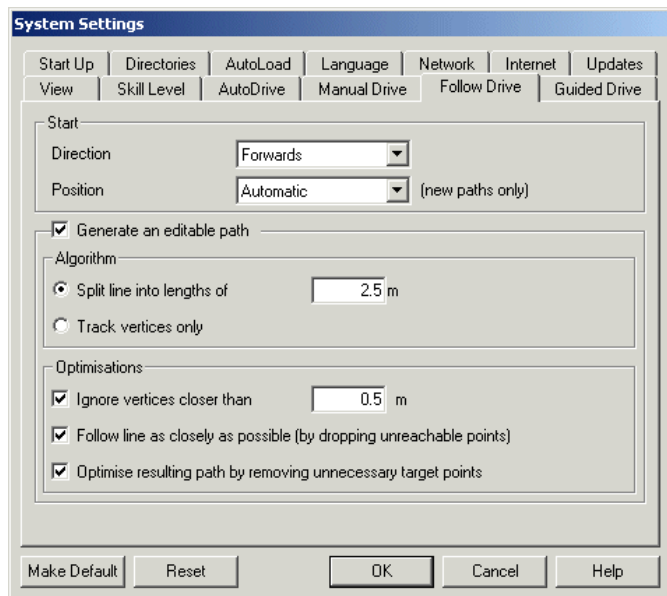
Otherwise...

4. The Library Explorer will appear for you to select a vehicle.



Library Explorer dialog

5. Select a vehicle and click **Proceed**. For help on how to select a vehicle refer to [Selecting a vehicle to drive](#) later in this section.
6. Pick an AutoCAD polyline (which may be 2D, 3D, splined, curve-fitted or contain straight and/or arc segments) or spline (2D, non-closed, non-periodic splines only) or MicroStation complex chain. The vehicle will follow the line starting at the end closest to the point picked. Closing segments of closed polylines are ignored.
7. The Follow Settings dialog will appear.



Follow Drive Settings dialog

8. Make sure that the **Start Direction** is set to the correct direction. Select Forwards or Reverse to force the direction of travel. Select Keep Current to continue in the current direction (if this manoeuvre follows one performed using a different drive mode). Select Automatic to determine the direction of travel based upon the orientation of the vehicle relative to the starting vertex of the polyline.
9. If you have a path pre-selected then the current vehicle position and orientation will be used and you should go to step 10. Otherwise, you will probably want **Start Position** set to Automatic, which will start the vehicle at the end of the line closest to the point you picked, with the steered wheels tangential to the line and all the spines aligned. If you want to adjust the position of the vehicle then select Manual.
10. If you are modelling aircraft then you should click on the Tracking Point tab and check that the Tracking Point's are set correctly, i.e. typically, Pilot's Eye or Front most Axle.
11. Change any other settings if necessary (see [System Settings: Paths: Follow Drive \(Roads only\)](#)) and then click **OK**.
12. The swept path will be generated and the path redrawn.

---

## Script (not Rail)

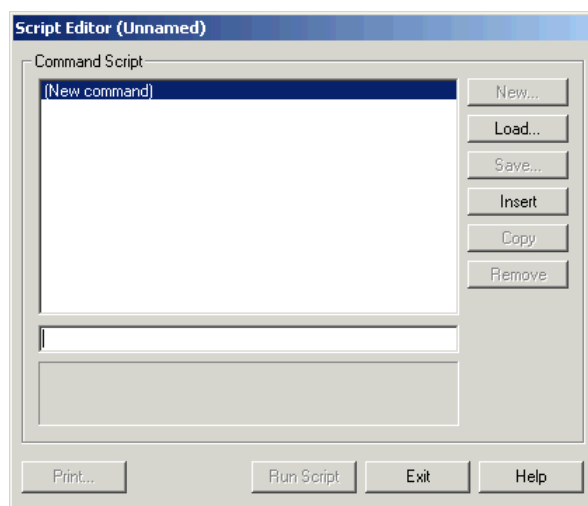
The Script language allows you to specify paths as a series of very well defined and manoeuvres. This means that you can generate “templates” of commonly used manoeuvres. It works with or without a pre-selected vehicle or path.



Script button

### To create or edit an AutoTrack script <sup>(6050)</sup>

1. Select **Script** from the AutoTrack drop down menu or click the **Script** button on the AutoTrack toolbar.
2. The Script Editor will appear. If you have already edited a script then this will appear in Command Script window.



Script Editor

3. Type your manoeuvre commands in the edit box. Each line that you type will be added to the Command Script window.
4. To remove a line, highlight it in the Command Script window and click **Remove**. The line will be removed.

#### Tip

*You can select multiple lines for deletion by dragging and/or holding down the <Ctrl> key as you select.*

5. To insert a command, highlight the position in the Command Script window and click **Insert**. A blank line will be inserted.
6. To copy a line to the end of the script, highlight it in the Command Script box and click **Copy**.

#### Tip

*Select multiple lines for copying by dragging and/or holding down the <Ctrl> key as you select.*

7. To clear the current command script click **New**.
8. You may print a hardcopy of a script by clicking the **Print** button.
9. A full list of script commands appears at the end of this section.

## To run an AutoTrack script

1. Create or load the required script.
2. Make sure that you have no path selected and then click the **Run Script** button.
3. The manoeuvre(s) will be generated on layers defined by the current layering convention settings. However, unlike other drive modes the script command will not prompt for a layer name if this option is enabled.
4. If the manoeuvre is incomplete then check the command line, it was probably impossible.

## To save an AutoTrack script

1. Click the **Save** button. The Save As dialog will appear.
2. Browse to the directory in which you wish to save the script and then click **Save**.

## To load an AutoTrack script

1. Click the **Load** button.
2. Browse to find the file that you wish to load and then click **Load**.

## AutoTrack script commands

There follows a list of script commands for reference purposes.

### ***Script Commands: General***

**;text**

Comment line (ignored)

**Etext**

Echo text to the command line when the script is run

**Utext**

Set the distance units for the rest of the script to text, where text is a valid units abbreviation (e.g. 'ft', 'm', 'mm' etc.). The default units are metres.

### ***Script Commands: New Path***

AutoTrack will automatically prompt for a vehicle, i.e. issue a **V?** command, if none is given in the script. A **V?** command in a script is ignored if a vehicle or path has been pre-selected.

**N**

Start a new path, using the currently selected vehicle (the start settings of the new path match the old path)

**V?**

Select the vehicle interactively (prompts for a vehicle using the Library Explorer)

### ***Script Commands: Positional***

The following positional commands are ignored if a drive command has been issued or if a path has been pre-selected. AutoTrack will automatically prompt for position, i.e. issue a **P?** command, if none is given in the script.



**P?**

Set the position interactively  
(if this command is placed at the end of the script you will be able to position the scripted manoeuvre)

**Px, y**

Set the start position of the path to **x, y** in the current UCS

**H?**

Set the heading interactively

**Hb**

Set the heading to **b** degrees in the current UCS

**S?**

Set the wheel angle interactively

**Sa**

**S+a**

Set the steering right at angle **a**

**Sra**

Set the steering right at angle **a**

**S-a**

Set the steering left at angle **a**

**Sla**

Set the steering left at angle **a**

**A?**

Set the articulation angles of all units interactively  
(prompts for unit and then angle)

**An?**

Set the articulation angle of unit **n** interactively  
(prompts for just the angle)

**An a**

Set the articulation angle of unit **n a** degrees to the right

**An +a**

Set the articulation angle of unit **n a** degrees to the right

**AnRa**

Set the articulation angle of unit **n a** degrees to the right

**An -a**

Set the articulation angle of unit **n a** degrees to the left

**AnLa**

Set the articulation angle of unit **n a** degrees to the left

### ***Script Commands: Drive***

Drive commands take the general form:-

{Direction}{Manoeuvre}[Turn condition]{Stop condition}

In the following list **{S}** indicates a mandatory stop condition and **[T]** indicates an optional turn condition.

**F{S}**

Drive forwards at current steering angle

**R{S}**

Reverse at current steering angle

**FC{S}**

Drive forwards at current steering angle

**RC{S}**

Reverse at current steering angle

**FH{S}**

Drive forwards with hands off  
(i.e. maintaining current wheel heading)

**FL[T]{S}**

Drive forwards and turn left as tightly as possible

**RL[T]{S}**

Reverse and turn left as tightly as possible

**FR[T]{S}**

Drive forwards and turn right as tightly as possible

**RR[T]{S}**

Reverse and turn right as tightly as possible

### ***Script Commands: Stop Conditions {S}***

A vehicle will automatically stop if it encounters an error state, for example if it over-articulates.

**A**

Stop when the wheel angle has increased by angle **a**  
(in the direction of the turn)  
N.B. applies only to turn commands, e.g. FL, FR, etc

**Ba**

Stop when the wheel bearing has reached **a**

**Wa**

Stop when the wheel angle has increased by angle **a**  
(in the direction of the turn)

**Wba**

Stop when wheel bearing reaches **a** in the current UCS

**d**

Stop after distance **d**  
N.B. applies only to non-turn commands, e.g. F, R, etc

**Dd**

Stop after distance **d**

**Ta**

Stop when tractor spine angle has increased by angle **a**

**Tba**

Stop when tractor spine reaches bearing **a** in the current UCS

**Un a**

Stop when the spine angle of unit **n** has increased by angle **a**

**UnBa**

Stop when the spine angle of unit **n** reaches bearing **a** in the current UCS

**Aa**

Stop when any articulation angle exceeds angle **a**

**An a**

Stop when the articulation angle of unit **n** exceeds angle **a**

**An1:n2 a**

Stop when the articulation angle between units **n1** and **n2** reaches angle **a**

### ***Script Commands: Turn Conditions [T]***

**Cr**

Set the steering to achieve a centre line chassis radius  $r$

**Or**

Set the steering to achieve an outer wheel radius  $r$

**Ir**

Set the steering to achieve an inner wheel radius  $r$

**Obr**

Set the steering to achieve an outer body radius  $r$

**Ibr**

Set the steering to achieve an inner body radius radius  $r$

**Sa**

**S+a**

Set the steering right at angle  $a$

**S-a**

Set the steering left at angle  $a$

---

## Guided Drive (Rail only)

The Guided Drive mode is used for trams and other light rail vehicles in which the vehicles position is entirely dictated by the rail layout.

### To use Guided Drive



*Guided Drive button*

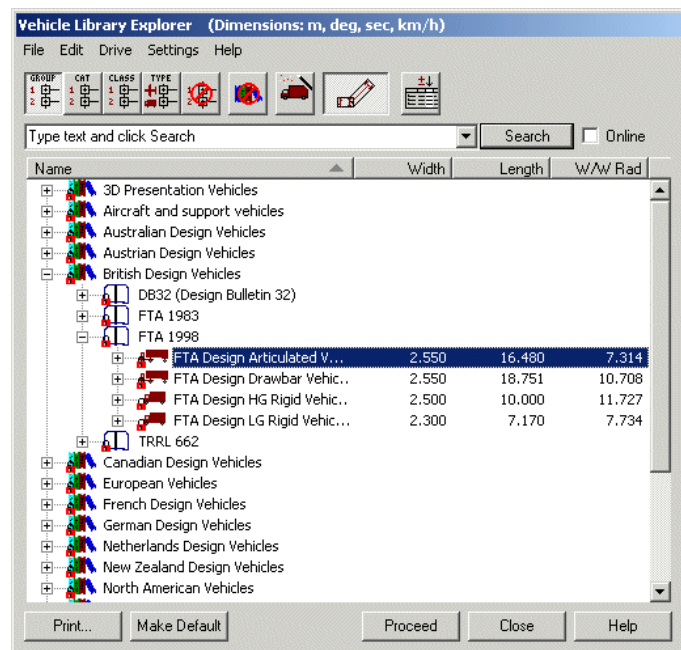
1. Select **Guided Drive** from the AutoTrack drop down menu or click the **Guided Drive** button on the AutoTrack toolbar.
2. If you have a default vehicle set up then AutoTrack will use this vehicle and you should go to step 6. If you want to use a different vehicle then right click now and refer to [Changing your vehicle](#).

Otherwise...

3. If you have a path pre-selected then AutoTrack will use the current vehicle and position and you should go to step 7.

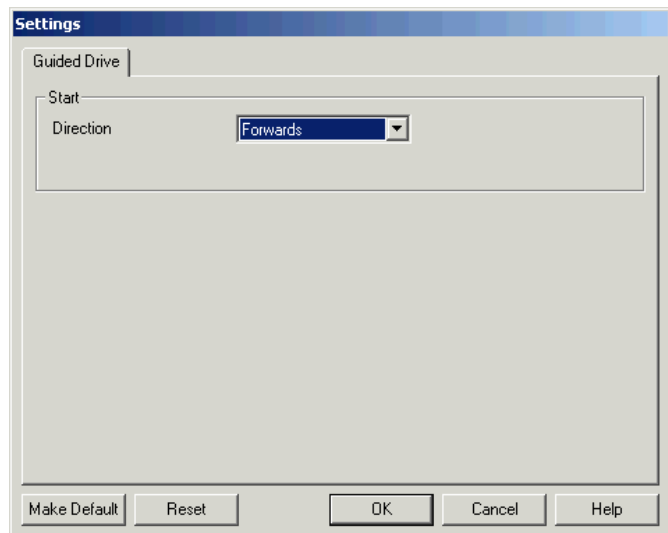
Otherwise...

4. The Library Explorer will appear for you to select a vehicle.



Library Explorer dialog

5. Select a vehicle and click **Proceed**. For help on how to select a vehicle refer to [Selecting a vehicle to drive](#) later in this section.
6. Pick an AutoCAD polyline (which may be 2D, 3D, splined, curve-fitted or contain straight and/or arc segments) or MicroStation complex chain. The vehicle will follow the line starting at the end closest to the point picked. Closing segments of closed polylines are ignored.
7. The Guided Drive Settings dialog will appear.



Guided Drive Settings dialog

8. Make sure that, if you want the vehicle to reverse along the line, the **Direction** is set to Reverse and then click **OK**.
9. The swept path will be generated and the path redrawn.

---

# Vertical Clearance

This drive mode allows you to model the vertical movement envelope of a vehicle. This then enables you to check for grounding of the vehicle or overhead impacts with other structures. The vehicle is assumed to have all wheels in contact with the road at all times. In the case of multiple axles this means that there may be some vertical movement of individual axles. This movement approximates to the behaviour of the vehicles suspension.

## To use Vertical Clearance

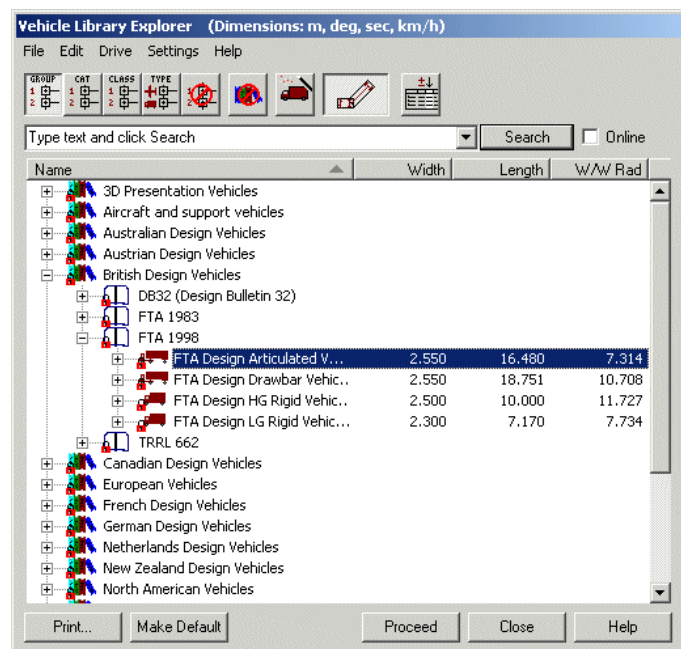


Vertical Clearance  
button

1. Select **Vertical Clearance** from the AutoTrack drop down menu or click the **Vertical Clearance** button on the AutoTrack toolbar.
2. If you have a default vehicle set up then AutoTrack will use this vehicle and you should go to step 5. If you want to use a different vehicle then right click now and refer to [Changing your vehicle](#).

Otherwise...

3. The Library Explorer will appear for you to select a vehicle.



Library Explorer dialog

4. Select a vehicle and click **Proceed**. For help on how to select a vehicle refer to [Selecting a vehicle to drive](#) later in this section.
5. Pick an AutoCAD polyline (which may be 2D, 3D, splined, curve-fitted or contain straight and/or arc segments) or MicroStation complex chain. The vehicle will follow the line travelling forwards starting at the end closest to the point picked. Closing segments of closed polylines are ignored.
6. The swept path will be generated and the path redrawn.

**Note**

*It is assumed that all wheels will remain in contact with the road. In order to do this some wheels will rise and some will fall. The extent of this movement is not controllable by the user.*

**Warning**

*Vertical Clearance mode uses default values for ground clearance and overall height that are unlikely to match your requirements. In order to generate useful results you **MUST** obtain and enter the accurate height and ground clearance.*

7. AutoTrack detects when the vertical clearance envelope cuts the vertical alignment and places a warning symbol at these locations.

## Civil 3D enhancement

AutoTrack understands that Civil 3D Profile Views are vertical alignments. It can also extract the surface polyline automatically. This means that users can pick a Profile View directly and let AutoTrack do the rest. The vertical clearance path of the vehicle will be drawn along the profile view and will update automatically if and when the profile changes.

**Note**

*AutoTrack can only track a vehicle along a Profile View if the horizontal and vertical scales are the same.*

---

## Park a Vehicle

This drive mode is included as a quick way to insert parked vehicles. For example, when designing a loading bay you may wish to model the case in which the bays on either side are occupied. The mode is functionally equivalent to starting an AutoDrive command and cancelling after the vehicle has been positioned.

### To use Park a Vehicle

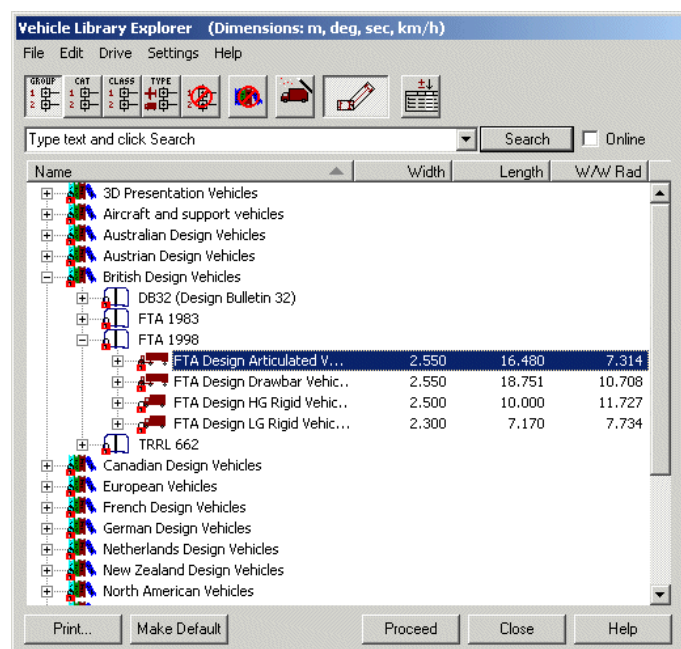


*Park a Vehicle button*

1. Select **Park a Vehicle** from the AutoTrack drop down menu or click the **Park a Vehicle** button on the AutoTrack toolbar.
2. If you have a default vehicle set up then AutoTrack will use this vehicle and you should go to step 5. If you want to use a different vehicle then right click now and refer to [Changing your vehicle](#).

Otherwise...

3. The Library Explorer will appear for you to select a vehicle.



Library Explorer dialog

4. Select a vehicle and click **Proceed**. For help on how to select a vehicle refer to [Selecting a vehicle to drive](#) later in this section.
5. Position and orient your vehicle and click **Finish**. For help on how to position a vehicle refer to [Positioning a vehicle interactively](#) later in this section. Note that if you move the vehicle over an AutoTrack parking bay the vehicle will automatically park in the correct position and orientation in the bay.
6. The vehicle is inserted as a path with no length and can, if needed, be selected and driven just like any other existing path.

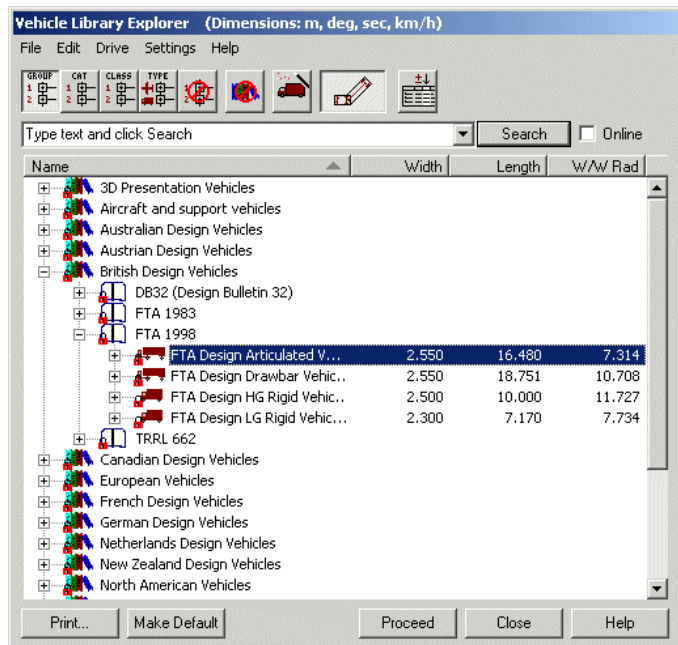


## Selecting a vehicle to drive



Vehicle Library button

1. If you don't have a default vehicle selected or you wish to use a different vehicle select **Vehicle Library** from the AutoTrack drop down menu or click the **Vehicle Library** button on the AutoTrack toolbar. The Library Explorer will appear.



Library Explorer dialog

2. If you do not have a vehicle library loaded all you will see is a bookshelf icon with the text Pool beside it. This represents the pool of vehicles used in and saved with your drawing.
3. If you have already used a vehicle then there will be a small + symbol beside the Pool icon. Click on this and the Pool will expand to list the vehicles held in the drawing.
4. The buttons at the top are mutually exclusive and allow you to group the vehicles by Vehicle Group (default), Category, Classification, Type or Ungrouped. There is also an option to display all vehicles for all libraries together.
5. The arrow on the header bar allows you to list the data in ascending or descending alphanumeric order. Click on the arrow to change the order or click on another column header to sort by another item of data.
6. You can add or remove data from the display by clicking the **Insert/Remove Columns** button. See [Customising the Library Explorer view \(Library Explorer Columns dialog\)](#) <sup>(3515)</sup>
7. Click the **Vehicle Diagram** button to switch the vehicle diagram on and off. See [Vehicle Diagram dialog](#) for details.
8. For more details of the Library Explorer dialog see [Viewing a vehicle in a library or the pool \(Library Explorer dialog\)](#) <sup>(3510)</sup> in [\\_d2h\\_bmk\\_Ref152132619\\_9](#).



Insert / Remove Columns button



Vehicle Diagram button

## To open a vehicle library



1. To open a library, select **Open Library** from the File menu

Vehicle Library icon



Vehicle Library icon

on the Library Explorer or right click and select **Open Library** from the menu that appears.

2. Browse to the Library subdirectory of the AutoTrack directory, select a library and click **Open**.
3. A new Vehicle Library icon will appear in the Library Explorer with the name of the library beside it.
4. Click on the + symbol to expand the library.

## To select a vehicle from a loaded library

1. Vehicle libraries are indicated by a bookshelf icon.
2. Click on the + symbol beside the library (or pool) that contains the required vehicle. The library will expand to reveal a list of vehicle groups.
3. Expand the category by clicking on the + symbol. A list of vehicles will appear.
4. Highlight a vehicle and click **Proceed** to select it.
5. If you do not have a default vehicle set then you will be asked if you want to make this your default vehicle. See [Default Vehicle dialog](#).
6. If your scale appears to be incorrect you will be given the opportunity to change it. See [Scale dialog](#).
7. The vehicle has been selected and may now be positioned. Proceed to [Positioning a vehicle interactively](#).

### Note

*If you have the prompt for scale option enabled you will see the Drawing Settings dialog before the Position Vehicle dialog.*

## To close a vehicle library

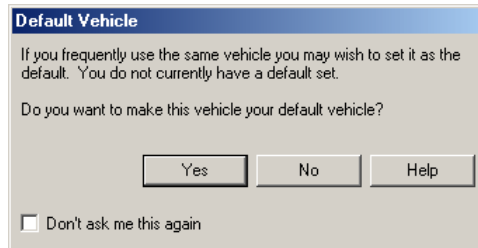
1. Highlight the library that you want to close.
2. Select **Close Library** from the File menu on the Library Explorer or right click and select **Close Library** from the menu that appears.
3. The selected library will be removed from the Library Explorer.

## To set a default vehicle

1. Highlight the vehicle that you want to set as your default and click the **Make Default** button.
2. The next time you select a drive mode this vehicle will be used.

## Default Vehicle dialog <sup>(5100)</sup>

1. AutoTrack allows you to define a default vehicle, i.e. a vehicle that will be used every time you start to drive unless you actively select an alternative. This can be very useful if you regularly use the same vehicle. If you select a vehicle to drive and you do not have a default vehicle set the Default Vehicle dialog will appear.

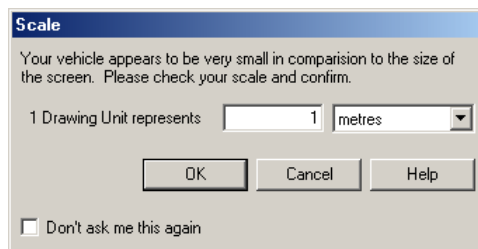


Default Vehicle dialog

2. If you select **Yes** then this vehicle will be selected automatically next time you use any drive command. If you select No then you will be asked this again the next time you select a vehicle in similar circumstances.
3. If you don't want to be asked again then tick **Don't ask me this again**.

## Scale dialog <sup>(5130)</sup>

1. If you are using the wrong units, e.g. AutoTrack is set to use millimeters but your drawing is in metres, your vehicle will appear out of proportion with the background. If this occurs and you have automatic scale checking enabled the Scale dialog will appear.



Scale dialog

2. Check your units are correct and change them if necessary.
3. If you want to switch off automatic scale checking then tick **Don't ask me this again**.

---

## Changing your vehicle

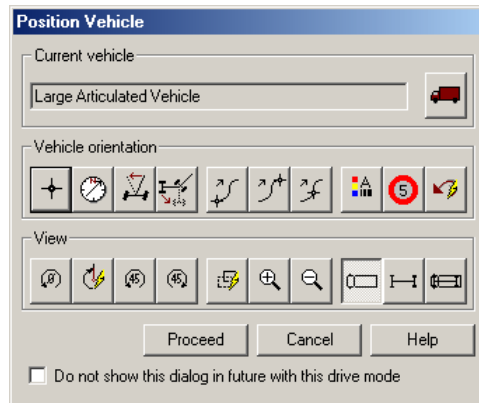
You can change your vehicle selection at any time before you start driving.

### To change the selected vehicle



*Vehicle Library button*

1. Right click to display the Position Vehicle dialog.



Position Vehicle dialog

2. Click the **Vehicle Library** button.
3. Select the new vehicle. For help on how to select a vehicle refer to [Selecting a vehicle to drive](#) in this section.
4. Click **Proceed** to position the vehicle interactively.

---

## Positioning a vehicle interactively

The vehicle orientation can be adjusted interactively until you start to drive. Once you have started to drive you may adjust the initial orientation using the Path tools.

With the vehicle selected move the cursor along the spine of the vehicle. Notice the small square that appears at each coupling point and at the front axle of the first unit. This is called a grip and is used to change between adjusting position, heading and articulation.

### To change the position of the vehicle

1. Move the cursor until the positioning grip appears over the front axle of the first unit and left click.
2. Use the mouse to move vehicle to the required location and left click to confirm.

### To change the heading of the vehicle

1. Move the cursor until the positioning grip appears at the rear coupling of the first unit and left click.
2. Use the mouse to adjust the heading of the entire vehicle and left click to confirm.

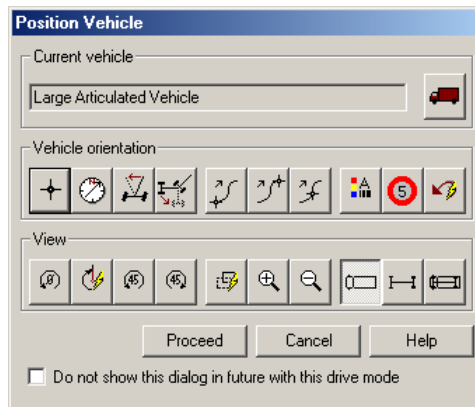
### To adjust the articulation

1. Move the cursor until the positioning grip is at the coupling point whose angle you want to adjust and left click.
2. Use the mouse to adjust the articulation angle and left click to confirm.

---

## Positioning a vehicle (Position Vehicle dialog) <sup>(6000)</sup>

If you don't want to use the interactive vehicle positioning right click immediately after selecting your vehicle and the Position Vehicle dialog will appear.



Position Vehicle dialog

### To set or change the position of the vehicle



Location button

1. Click the **Location** button.
2. Use the mouse to move the vehicle and click the mouse button to confirm.

### To set or change the heading of the entire vehicle



Heading button

1. Click the **Heading** button.
2. Use the mouse to adjust the orientation and click the mouse button to confirm.

### To set or change the starting steering angle



Steering button

1. Click the **Steering** button.
2. Use the mouse to adjust the steering angle and click the mouse button to confirm.

### To set or change the starting orientation of a selected spine



Articulation button

1. Click the **Articulation** button.
2. If there is only one articulation point then you will automatically be requested to adjust the trailer spine. If there is more than one articulation point you will be asked to pick the unit that you want to adjust. In either case simply move the cursor to reorient the appropriate spine and click the mouse button to confirm.

## To position the vehicle at the start of an existing path



*Start of Path button*

1. Click the **Start of Path** button.
2. You will be asked to select the path.

## To position the vehicle at the end of an existing path



*End of Path button*

1. Click the **End of Path** button.
2. You will be asked to select the path.

## To position the vehicle at a point on an existing path



*Point on Path button*

1. Click the **Point on Path** button.
2. You will be asked to point to the required position.

## To view the path properties



*Properties button*

1. Click the **Properties** button.

## To view the model settings



*Model button*

1. Click the **Model** button.

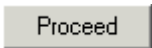
## To undo the last operation



*Undo button*

1. Click the **Undo** button.

## To start driving



*Proceed button*

1. Click the **Proceed** button.
2. The **Drive** dialog (or the Drive command line) will appear.

## To adjust the view

For your convenience the View toolbar functions are repeated on this dialog. For help in adjusting the view refer to [Adjusting the view](#).

---

## Adjusting the view (View toolbar)

Whilst you can use the built-in CAD functions to manipulate the view, AutoTrack includes a number of intelligent view functions that take account of the current AutoTrack path.

### To reset any drawing rotation



*Reset Rotation button*

1. Select **Rotate, Reset** from the AutoTrack, View drop down menu or click the **Reset Rotation** button.
2. The drawing rotation will be reset to zero.

### To rotate the drawing to the left



*Rotate Left button*

1. Select **Rotate, Left** from the AutoTrack, View drop down menu or click the **Rotate Left** button.
2. The drawing will be rotated 45 degrees to the left.

### To rotate the drawing to the right



*Rotate Right button*

1. Select **Rotate, Right** from the AutoTrack, View drop down menu or click the **Rotate Right** button.
2. The drawing will be rotated 45 degrees to the right.

### To rotate the drawing automatically



*AutoRotate button*

1. Select **Rotate, Auto** from the AutoTrack, View drop down menu or click the **AutoRotate** button.
2. The drawing will be rotated until the steered wheels point directly up the screen.

### To pan the image (e.g. if the vehicle is close to the edge of the window)



*AutoPan button*

1. Select **AutoPan** from the AutoTrack, View drop down menu or click the **AutoPan** button.
2. By default this will move the drawing so that after the pan the steered wheels of the vehicle are located slightly off centre and pointing directly through the centre of the screen. Depending upon your settings the drawing may also be rotated.

### To zoom in



*Zoom In button*

1. Select **Zoom, In** from the AutoTrack, View drop down menu or click the **Zoom In** button.
2. The screen image will be magnified by a factor of 2.

### To zoom out



1. Select **Zoom, Out** from the AutoTrack, View drop down menu or click the **Zoom Out** button.



*Zoom Out button*

2. The screen image will be reduced by a factor 0.5.



*Show Body button*

### To show only the vehicle body

1. Select **Show Body** from the AutoTrack, View drop down menu or click the **Show Body** button.
2. Only the body of each unit to will be displayed whilst driving.



*Show Chassis button*

### To show only the vehicle chassis

1. Select **Show Chassis** from the AutoTrack, View drop down menu or click the **Show Chassis** button.
2. Only the chassis of each unit will be displayed whilst driving.



*Show All button*

### To show both the vehicle body and chassis

1. Select **Show All** from the AutoTrack, View drop down menu or click the **Show All** button.
2. Both the body and the chassis of all units will be displayed whilst driving.



# Swept Paths: Editing paths

All swept paths, as long as they have not been exploded can be edited to adjust the colour, content or even alignment. The AutoTrack Properties command lets you edit a single path whilst the Drawing Explorer allows you to copy path attributes between drawings.

---

## Adjusting the path alignment (Edit Tools toolbar)

### Tip

*Almost all the operations described in this section are simpler to perform using grip editing. See [Adjusting the path alignment using grip editing](#).*

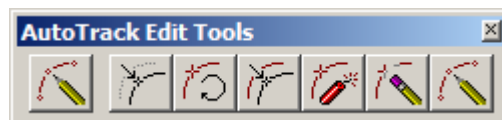
All paths, except those created using Guided Drive, are stored as a series of target points through which the vehicle is required to drive. AutoTrack allows you to move the target points of a path, dynamically updating the path to reflect changes in position.

If you edit the path in such a way that the vehicle cannot get from a given point to the next target the remainder of the path will drawn as a single line (red by default). See [Undriveable Paths](#) <sup>(5050)</sup>.



Edit Tools button

1. Click the **Edit Tools** button on the toolbar. The Edit Tools toolbar will appear.



Edit Tools toolbar

## To see the target points on the path

Target points are shown as small diagonal crosses along the path. If you cannot see any target points on your path make sure that you have them enabled. To do this...



Properties button

1. Select **Properties** from the AutoTrack drop down menu or click the **Properties** button on the main AutoTrack toolbar and select the path if necessary. The Path Properties dialog will appear.
2. Select the **Reports** tab.
3. Expand the **Construction Lines** report by clicking on the small + symbol and make sure that both the **Construction Lines** report and the **Target Points** sub-report are ticked.

## To move the path



AutoTrack Move button

1. Select **Move AutoTrack Object** from the **AutoTrack, Edit Tools** drop down menu or click the **AutoTrack Move** button on the **Edit Tools** toolbar.

2. Select the path if necessary.
3. Left click at the base point.
4. Move the mouse to move the path and click again to confirm the displacement.

## To rotate the path



*AutoTrack Rotate button*

1. Select **Rotate AutoTrack Object** from the **AutoTrack, Edit Tools** drop down menu or click the **AutoTrack Rotate** button on the **Edit Tools** toolbar.
2. Select the path if necessary.
3. Left click to specify the base point about which the path is to be rotated.
4. Move the mouse to rotate the path and click again to specify the rotation angle.

## To copy the path



*AutoTrack Copy button*

1. Select **Copy AutoTrack Object** from the **AutoTrack, Edit Tools** drop down menu or click the **AutoTrack Copy** button on the **Edit Tools** toolbar.
2. Select the path if necessary.
3. Move the mouse until the copy is in the required position and left click to confirm.

## To explode the path entity (or cell)



*AutoTrack Explode button*

1. Select **Explode AutoTrack Object** from the **AutoTrack, Edit Tools** drop down menu or click the **AutoTrack Explode** button on the **Edit Tools** toolbar.
2. Select the path if necessary.
3. The path will be exploded into standard CAD entities.

## To delete a path



*AutoTrack Delete button*

1. Select **Delete AutoTrack Object** from the **AutoTrack, Edit Tools** drop down menu or click the **AutoTrack Delete** button on the **Edit Tools** toolbar.
2. Select the path if necessary.
3. The path will be deleted.

## To delete the last target point (not Rail)

Deleting the last target point is a command that is only applicable to swept paths and so it appears on the Swept Paths toolbar and menu.



*AutoTrack Delete Last Target button*

1. Select **Delete Last Target** from the AutoTrack, Swept Paths drop down menu or click the **AutoTrack Delete Last Target** button on the Swept Paths toolbar and select the path if necessary.
2. The last target point on the selected path will be removed.

### Tip

*You can delete the last target point “on-the-fly” whilst using AutoDrive. Left click with the cursor inside the wheelbase of the last drawn vehicle position.*

---

## Adjusting the path alignment using grip editing

All paths, except those created using Guided Drive, are stored as a series of target points through which the vehicle is required to drive. The Dynamic Edit functionality incorporated in AutoTrack allows you to move the target points of a path, dynamically updating the path to reflect changes in position. Grip editing mode allows you to make all path adjustments interactively simply by picking and dragging grips.

If you edit the path in such a way that the vehicle cannot get from a given point to the next target the remainder of the path will drawn as a single line (red by default). See [Undriveable Paths](#) <sup>(5050)</sup>.

### Note

*AutoDrive and Dynamic Editing are options and may not be available on your copy.*

## To enter grip editing mode



*Grip Edit button*

1. Select the path and click **Grip Edit** on the **Edit Tools** toolbar or select **Edit Tools, Grip Edit** from the AutoTrack drop down menu.
2. Grips will appear at various locations along the path and vehicle. The shape of the grips indicates what they do and when you hover over the grip it will change colour and a text grip tip will confirm the associated action.

### Note

*AutoCAD and SavoyCAD have their own grip editing modes which are enabled by simply selecting the path. This works just like the AutoTrack’s dynamic editing mode.*

## To see the target points on a path

Target points are shown as small diagonal crosses along the path. If you cannot see any target points on your path make sure that you have target point markers enabled in the Construction Lines settings. To do this...



*Properties button*

1. Select **Properties** from the AutoTrack drop down menu or click the **Properties** button on the main AutoTrack toolbar and select the path if necessary. The Path Properties dialog will appear.

2. Select the **Reports** tab.
3. Expand the Construction Lines report, by clicking on the + symbol, and make sure that both **Construction Lines** and **Target Points** are ticked.

## To see the steering pointer

The steering pointer is a line drawn from the centre of the primary steered axle at the same angle as the steered wheels. If you cannot see the steering pointer then make sure you have the steering pointer enabled in the Construction Lines settings. To do this...

1. Select **Properties** from the AutoTrack drop down menu or click the **Properties** button on the main AutoTrack toolbar and select the path if necessary. The Path Properties dialog will appear.
2. Select the Reports tab.
3. Select the Construction Lines tab followed by the Steering Pointer tab and make sure that both **Construction Lines** and **Steering Pointer** are ticked.



*Properties button*

## To adjust the vehicle start heading (not Rail)

1. Enter grip editing mode so that the editing grips appear. (See [To enter grip editing mode](#)).
2. Select the **Adjust Spine Angle** grip on the first unit.
3. Move the mouse to rotate the units and right click again to confirm the new position.

## To adjust the vehicle start steering angle (not Rail)

1. Enter grip editing mode so that the editing grips appear. (See [To enter grip editing mode](#)).
2. Select the **Adjust Steering Angle** grip at the end of the steering pointer.
3. Move the mouse to adjust the steering angle and right click again to confirm the new angle.

## To adjust the vehicle start spine angles (not Rail)

The spine angles are adjusted by rotating a selected unit and all those behind it about the front articulation point of the selected unit.

1. Enter grip editing mode so that the editing grips appear. (See [To enter grip editing mode](#)).
2. Select the **Adjust Spine Angle** grip on the unit or spine you wish to adjust.
3. Move the mouse to rotate the units and right click again to confirm the new position.

## To move a path

Adjusting the vehicles start position has the effect of moving the entire path.

1. Enter grip editing mode so that the editing grips appear. (See [To enter grip editing mode](#)).
2. Select the **Move Path** grip on the first unit. Be careful not to pick the **Adjust Target Point** grip.
3. Move the path and click again to confirm the new position.

## To move a target point (not Rail)

1. Enter grip editing mode so that the editing grips appear. (See [To enter grip editing mode](#)).
2. Select the **Adjust Target Point** grip of the target point that you want to move.
3. Move the point to its new location and right click again to confirm the new position. See also [To stretch a section in a path \(not Rail\)](#).
4. If the new position means that the vehicle cannot complete the manoeuvre a single line will connect the point to the last acceptable target point. This line represents the Errored Path.

## To stretch a section in a path (not Rail)

1. Enter grip editing mode so that the editing grips appear. (See [To enter grip editing mode](#)).
2. Select the **Adjust Target Point** grip of the target point that you want to move.
3. To move all the section of path before the selected target point hold the <Ctrl> key down while moving the mouse. All target points from the start of the path to the current target point will move together maintaining their relative positions.
4. To move all the section of path after the selected target point hold the <Alt> key down while moving the mouse. All target points from the current target point to the end of the path will move together maintaining their relative positions.
5. Move the section of path and left click to confirm.

## To adjust a bearing turn (not Rail)

1. Enter grip editing mode so that the editing grips appear. (See [To enter grip editing mode](#)).
2. All bearing turns should have two dotted lines parallel to the entry to the turn and two parallel to the exit from the turn. Two of these will be on the centreline of the path and the other two offset to the outside of the turn. If you cannot see these lines, open the **Report Wizard**, go to the **Construction Lines** page and make sure that **Drag Lines** are ticked.
3. The lines closest to the centreline of the path cannot be moved and are tangents to the entry and exit alignments.



*Report Wizard button*

The outer lines have **Adjust Side Overturn** and **Adjust Exit Overturn** grips halfway along them.

4. Select the grip you wish to adjust and drag it away from or towards the other line to increase or decrease the offset. Left click to confirm the new position.

## To insert a new target point (not Rail)

1. Enter grip editing mode so that the editing grips appear. (See [To enter grip editing mode](#)).
2. In between the target point markers there will be intermediate **Insert Target Point** grips.
3. Select the **Insert Target Point** grip closest to where you wish to insert the target point. Move the new target point and left click to confirm the new position.
4. If you cannot see an intermediate grip then you may need to reduce the distance between intermediate. To do this click on the **System Settings** button on the AutoTrack toolbar, select the AutoDrive tab and adjust the **Minimum Distance between Intermediate Grips**.



*System Settings button*

## To remove a target point (not Rail)

1. Enter grip editing mode so that the editing grips appear. (See [To enter grip editing mode](#)).
2. Select the **Adjust Target Point** grip of the target point that you want to remove.
3. Drag the grip over the top of the preceding or following target point and left click to confirm. The selected target point will be removed.
4. You may only remove one target point at a time. If you drop the selected point onto an intermediate grip the point will not be removed but moved and this may result in an errored path.

## To trim the start of the path

1. Enter grip editing mode so that the editing grips appear. (See [To enter grip editing mode](#)).
2. Select the **Trim Start of Path** grip adjacent to the first unit at the start of the path.
3. Move the mouse and left click to trim the path.

## To trim the end of the path

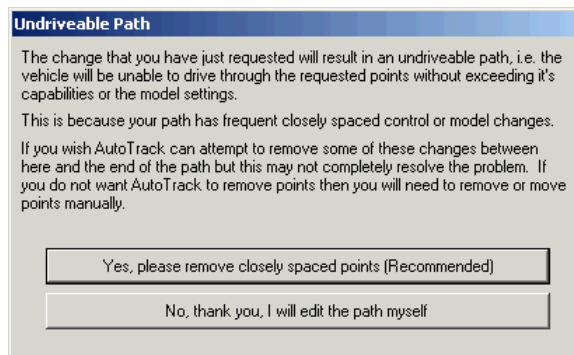
1. Enter grip editing mode so that the editing grips appear. (See [To enter grip editing mode](#)).
2. Select the **Trim End of Path** grip adjacent to the first unit at the end of the path.
3. Move the mouse and left click to trim the path.



---

## Undriveable Paths (5050)

If you try to edit a path that consists of many closely spaced target points (which tends to happen when using Manual Drive) you may end up with an undriveable path. Under these circumstances you may need to delete some target points. AutoTrack may offer to perform this operation on the section of path from the point you dragged to the end. You will see the Undriveable Path dialog.



Undriveable Path dialog

1. Select **Yes** to allow AutoTrack to remove points automatically or **No** if you wish to edit the path manually.
2. If you select **Yes** AutoTrack will remove closely spaced points on the section of path from the selected point to the end of the path. This may not always result in a driveable path, because it only removes points and does not optimise the remaining, but is nevertheless the recommended option. Use Undo to restore the path if you don't like the changes that AutoTrack makes.
3. If you select **No** then the path will not be altered (apart from storing the data slightly differently – see below).

### Warning

*Manual Drive path data is converted to AutoDrive target points as soon as you try to edit it. For this reason changing a model value on a non-errored path, that results in a path error and then changing it back will not necessarily result in the original non-errored path. To get back the original path you should use Undo.*

---

## Extending a path

Once created paths can be extended very easily.

### To extend a path

1. Select the path that you want to extend.
2. Select a drive mode from the AutoTrack drop down menu or by clicking the appropriate button on the main AutoTrack toolbar.
3. Resume driving from the end of the path.

---

## Editing path properties (Path Properties dialog)



*Properties button*

1. Select the path whose properties you wish to see.
2. Select **Properties** from the AutoTrack drop down menu or click the **Properties** button on the AutoTrack toolbar.
3. The Path Properties dialog will appear with the **Path Notes** tab displayed.

The screenshot shows the 'Properties' dialog box with the 'Path Notes' tab selected. The dialog has a title bar 'Properties' and four tabs: 'Path Notes', 'Vehicle', 'Manoeuvres', and 'Reports'. The 'Path Notes' tab is active. It contains the following fields:

- Path ID:** A text box containing the value '1'.
- Title:** An empty text box.
- Path Scale:** A text box containing the value '1 Drawing Unit represents 1m'.
- Layer Name Prefix:** A text box containing the value 'ATR01'.
- Comments:** A large empty text area.
- Status:** A text box containing the value 'Fwd:5.00km/h Min Center Radius=13.81m'.

At the bottom of the dialog are five buttons: 'Make Default', 'Reset', 'OK', 'Cancel', and 'Help'.

Path Properties dialog: Path Notes tab

4. Enter values in the fields provided and click **OK** to confirm and close the dialog.
5. Click **Apply** if you wish to confirm the changes but not close the dialog. Click **Cancel** to abort all changes since the last time you clicked **Apply**.

## Path Properties: Path Notes <sup>(5010)</sup>

1. Click on the **Path Notes** tab.
2. Edit the **Title** and **Comments** as required.
3. **AutoCAD version**

The **Layer Name Prefix** is the AutoCAD base layer name as defined by your selected layering convention. If you are not using a layering convention this is the current layer.

### MicroStation version

The **Base Level** is the level on which the path exists. You may change this to any other level from 1 to 63 by selecting from the drop down list.

4. The **Path Scale** is a read only field. It shows the scale of the selected path. When using XREF drawings in AutoCAD or reference drawings in MicroStation there is a risk that incompatible units can be used alongside one another.

## Path Properties: Vehicle

1. Click on the **Vehicle** tab.

**Properties**

Path Notes | **Vehicle** | Manoeuvres | Reports

Name: California Design Vehicle (15m MTCR, 1 Axle Trailer) ... Ref: 100075

Type: Articulated vehicle

Category: Savoy

Classification: Savoy

Units

Unit	Name	Max Artic.
1 x	California Design Vehicle Tractor (15m MTC	N/A
2	California Design Vehicle 1-Axle Trailer	90

Move Up  
View...  
New...  
Remove

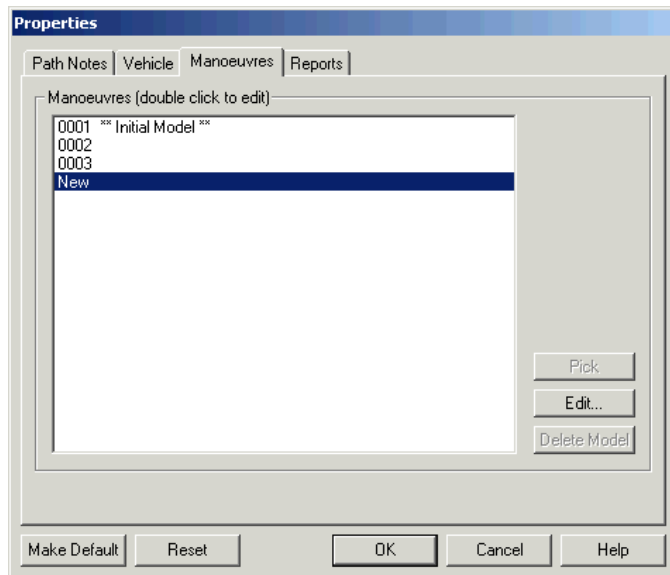
Make Default Reset OK Cancel Help

Path Properties dialog: Vehicle tab

2. You may not edit the vehicle details but the details are the same as displayed in the [Creating a new library \(Library Details dialog\) \(3520\)](#).
3. Click on the **View** button to look at the unit details which again are as displayed in the [Unit Details dialog](#).

## Path Properties: Manoeuvres (5020)

1. Click on the **Manoeuvres** tab. A list of manoeuvres is displayed, each one representing a section of path, which can be driven with a single drive 'command'. The name is normally blank but will contain the text **\*\* Model Change \*\*** if a model setting changes at this manoeuvre. The first section will contain the text **\*\* Initial Model \*\***.

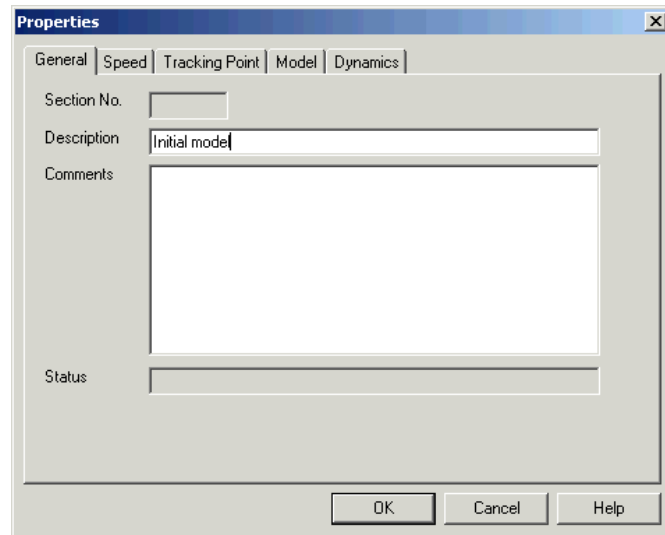


Path Properties dialog: Manoeuvres tab

2. As you move the cursor down the list a ghost image of the vehicle is drawn at the start of the manoeuvre section of path.
3. Click **Edit** to view the Model and Speed settings. If you change a setting then the text **\*\* Model Change \*\*** will appear in the Name. Edit the manoeuvre reference **New** to change the model for future manoeuvres.
4. Click **Delete Model** to remove a model change.
5. Enter values in the fields provided and click **OK** to confirm and close the dialog.
6. Click **Apply** if you wish to confirm the changes but not close the dialog. Click **Cancel** to abort all changes since the last time you clicked **Apply**.

### ***Path Properties: Manoeuvres: General*** <sup>(5040)</sup>

1. Click on the **General** tab.



Path Properties dialog: Manoeuvres: General tab

2. Edit the **Description** and **Comments** as required. The description is displayed in the manoeuvres list.

### ***Path Properties: Manoeuvres: Speed***

1. Click on the **Speed** tab.
2. See Settings: Speed.

### ***Path Properties: Manoeuvres: Tracking Point***

1. Click on the **Tracking Point** tab.
2. See Settings: Tracking Point.

### ***Path Properties: Manoeuvres: Model***

1. Click on the **Model** tab.
2. See Settings: Model.

### ***Path Properties: Manoeuvres: Dynamics***

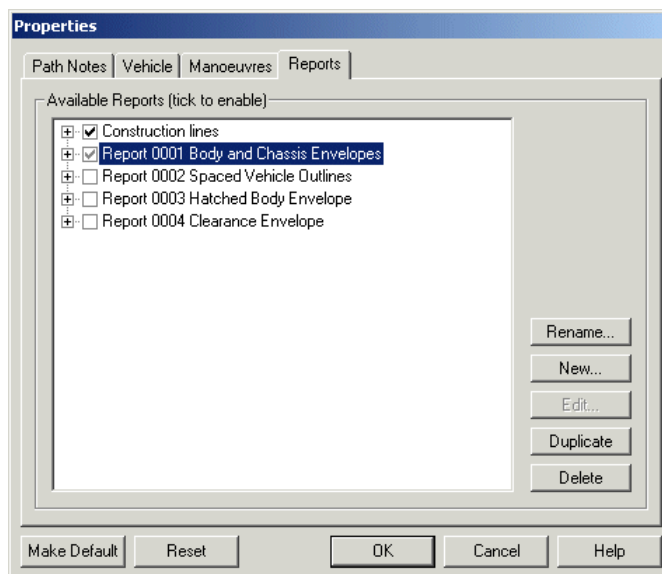
1. Click on the **Dynamics** tab.
2. See Settings: Dynamics.

### ***Path Properties: Manoeuvres: Transitions***

1. Click on the **Transitions** tab
2. See Settings: Transitions.

## Path Properties: Reports

1. Click on the **Reports** tab. A list of all current reports will appear.



Path Properties dialog: Reports tab

2. Click the + symbol to expand the explorer view and tick those elements that you want to include.
3. To edit a report see Settings: Reports.

---

## Adjusting model settings (Roads only)

Model settings apply from the point at which they are made until the next change of model. Model changes are indicated with an octagon around the relevant target point. See [Drawing Settings: Paths: Model \(Roads & Airports\)](#) <sup>(2070)</sup> for more details.

### To change the absolute steering limits



Properties button

1. Select the path that you want to edit.
2. Select **Properties** from the AutoTrack drop down menu or click the **Properties** button on the AutoTrack toolbar. The Path Properties dialog will appear.
3. Click the **Manoeuvres** tab.
4. Highlight the required manoeuvre and click the **Edit** button. The manoeuvre details dialog will appear.
5. Click the **Model** tab.  
The steering can be limited in three ways:-  
Select **Limit steering to percentage** to change the steering capability of your selected vehicle as a factor of the actual maximum steering angle.  
Select **Limit steering to angle** to set a new maximum steering angle.  
Select **Limit steering to radius** to specify the maximum steering angle in terms of an equivalent radius. The radius may be to the inside of the inner wheels, the outside of the outer wheels, or the centreline of the steered axle.



Properties button

## To change the absolute articulation limits

1. Select the path that you want to edit.
2. Select **Properties** from the AutoTrack drop down menu or click the **Properties** button on the AutoTrack toolbar. The Path Properties dialog will appear.
3. Click the **Manoeuvres** tab.
4. Highlight the required manoeuvre and click the **Edit** button. The manoeuvre details dialog will appear.
5. Click the **Model** tab.  
The articulation angles can be limited in two ways:-  
Select **Limit to percentage** to change the articulation limits of your selected vehicle as a factor of the actual maximum articulation angle.  
Select **Limit to angle** to set a new maximum articulation angle.

---

## Adjusting speed settings

Speed settings apply from the point at which they are made until the next change of model. Speed changes are indicated with an octagon around the relevant target point. See [Drawing Settings: Paths: Speed \(Roads, Rail & Airports\)](#) <sup>(2086)</sup> for more details.



Properties button

## To change the design speed

1. Select the path that you want to edit.
2. Select **Properties** from the AutoTrack drop down menu or click the **Properties** button on the AutoTrack toolbar. The Path Properties dialog will appear.
3. Click the **Manoeuvres** tab.
4. Highlight the required manoeuvre and click the **Edit** button. The manoeuvre details dialog will appear.
5. Click the **Speed** tab.
6. You may set different values for the **Forwards Design Speed** and the **Reverse Design Speed**.

---

## Adjusting transition settings (not Rail)

Turn transition types apply from the point at which they are made until the next change of model. Transition changes are indicated with an octagon around the relevant target point. See [Drawing Settings: Paths: Transitions \(Roads & Airports\)](#) <sup>(2085)</sup> for more details.

## To change the turn transition types

1. Select the path that you want to edit.
2. Select **Properties** from the AutoTrack drop down menu or click the **Properties** button on the AutoTrack toolbar. The Path Properties dialog will appear.
3. Click the **Manoeuvres** tab.



Properties button

4. Highlight the required manoeuvre and click the **Edit** button. The manoeuvre details dialog will appear.
5. Click the **Transitions** tab.
6. Tick **Limit Forward Turn Rate** or **Limit Reverse Turn Rate** to restrict the rate of application of steering lock when travelling forwards and backwards respectively.

Select **Based Upon Speed** to impose a turn rate that causes the overturn to increase with speed. The turn rate (degrees per unit of distance) will be calculated as follows:-

$$R = A / V t$$

Select **Based Upon Lock to Lock Distance** to impose a limit that is fixed for all speeds. The turn rate (degrees per unit of distance) will be calculated as follows:-

$$R = A / d$$

Where:-

- R** is Max Turn Rate
- A** is Max Steering Angle
- V** is Design Speed
- t** is Lock to Lock Time
- d** is Lock to Lock Distance

Select **Based upon Circular Tangential Arc** to follow a pure circular arc. This option is only available for forward turns.

7. Tick **Turn on the spot at start of all forwards sections** or **Turn on the spot at start of all reverse sections** to turn the steering instantaneously at each change of angle whilst the vehicle is travelling forwards or backwards respectively.
8. Tick **Set optimum steering angle at start of path** to allow the steering to turn to the best starting angle at the beginning of the path. Note that this option always applies to the start point regardless of which target point is currently being examined.

---

## Adjusting the tracking point (not Rail)

Tracking Point settings apply from the point at which they are made until the next change. Tracking Point changes are indicated with an octagon around the relevant target point. See [Drawing Settings: Paths: Tracking Point \(Roads & Airports\)](#) <sup>(2170)</sup> for more details.

### To change the tracking point



*Properties button*

1. Select the path that you want to edit.
2. Select **Properties** from the AutoTrack drop down menu or click the **Properties** button on the AutoTrack toolbar. The Path Properties dialog will appear.
3. Click the **Manoeuvres** tab.
4. Highlight the required manoeuvre and click the **Edit** button. The manoeuvre details dialog will appear.
5. Click the **Tracking Point** tab.



6. Select the Front Tracking Point and Rear Tracking Point as required.

---

## Adjusting dynamics settings (not Rail)

Dynamics settings apply from the point at which they are made until the next change. Dynamics changes are indicated with an octagon around the relevant target point. See [Drawing Settings: Paths: Dynamics \(Roads & Airports\)](#) <sup>(2180)</sup> for more details.

### To change dynamics settings



*Properties button*

1. Select the path that you want to edit.
2. Select **Properties** from the AutoTrack drop down menu or click the **Properties** button on the AutoTrack toolbar. The Path Properties dialog will appear.
3. Click the **Manoeuvres** tab.
4. Highlight the required manoeuvre and click the **Edit** button. The manoeuvre details dialog will appear.
5. Click the **Dynamics** tab.
6. Tick the **Limit for Dynamic Effects** box to apply a turning radius limit based upon driver comfort and allowing for side friction and super elevation.

---

## Vehicle details report

### To insert a vehicle details report



*Insert Profile button*

1. Select the path whose vehicle details you wish to insert.
2. Select **Insert Profile** from the AutoTrack drop down menu or click the **Insert Profile** button on the AutoTrack toolbar.
3. A ghosted picture of the vehicle will appear at the cursor.
4. Move the mouse to position the report and left click to confirm.
5. To edit or disable the report see [d2h\\_bmk\\_Ref25938173\\_9](#)

### To move a vehicle details report

1. Select the report that you want to move. Note that the report and its associated path and any other reports will appear selected.
2. Pick the grip at the centre of the front wheels of the first unit and holding the left mouse button down, move the details report as required. Release the mouse button to drop the report.

### To remove a vehicle details report



*Properties button*

1. Select the report that you want to remove.
2. Select **Properties** from the AutoTrack drop down menu or click the **Properties** button on the AutoTrack toolbar.

3. Select the **Reports** tab.
4. Click the + next to Report 0001 to display the sub-reports and untick the Profile sub-report.
5. If you have more than one report listed (i.e. Report 0001, Report 0002, etc) then you will need to expand each in turn and make sure that the Profile report is disabled in each.

---

## Placing discrete body outlines <sup>(5140)</sup>

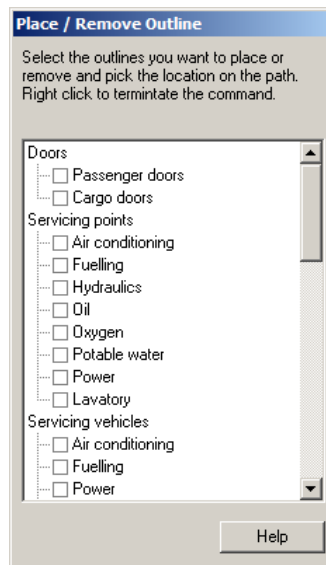
### To place discrete outlines

You can add discrete outlines using the reports dialogs. However, there is a quick way to add them using the Place Outline command.

1. Select the path on which you wish to add discrete outlines.
2. Select **Place Outline** from the AutoTrack drop down menu or click the **Place Outline** button on the AutoTrack toolbar. The Place / Remove Outline dialog will appear.



*Place Outline button*



Place / Remove Outline dialog

3. Tick the discrete elements that you want to add.
4. To place them, move the cursor until they appear at the required location on the path and left click to confirm. You can remove the selected outlines by reselecting the location.

The rule is:-

If **all** the selected elements **are present** at the chosen location, then when you left click all the selected elements will be removed.

If **any** of the selected elements **are not present** at the chosen location, then when you left click the missing selected elements will be added.

5. To remove a particular outline from a location tick just this outline type and select the location.
6. To quickly remove all outlines from a location tick all outline types and select the location twice (once to add any non-

existent outlines and a second time to remove them all).

---

## Ground conflict report

You can generate a ground conflict report in any version of AutoTrack but in systems that do not support surfaces the ground will be assumed to be a flat plane.

### To place a ground conflict report

1. First make sure that, if you are using a CAD system that supports surfaces, such as Civil 3D or MicroStation, you assign a final surface to the path. Otherwise the analysis will be performed on a flat plane.
2. Now select the path and click the **Insert Ground Conflict Report** button and wait a few seconds while the analysis is performed.
3. When the analysis is complete the locations that are in danger of hitting, or have hit the ground, will be indicated with ground proximity contours. The contours are currently drawn at hard-coded intervals 50mm or 2in apart. The contours are coloured as follows:-

More than 100mm ground clearance:	{nothing}
Between 50mm and 100mm ground clearance:	green
Between zero and 50mm ground clearance:	yellow
Between zero and 50mm ground penetration:	orange
Between 50mm and 100mm ground penetration:	magenta
More than 100mm ground penetration:	red

4. Within each zone of conflict the location of the critical point, i.e. the point of maximum ground penetration or minimum ground clearance, will be shown along with the value.
5. A profile, or cross-section, will automatically be generated at each critical point. These profiles will be stacked at the lower right hand extent of the drawing. The precise critical point will also be indicated on these profiles.
6. The report will be saved in the drawing but if the path is altered in any way, the report will disappear and need to be regenerated. This is a safeguard to minimise the risk of using data that is out of date.

---

## Extracting path data

Sometimes there is a need to analyse paths in more detail than is possible in a CAD system. The Extract command allows you to save path data as text files which can then be imported into a spreadsheet program and further examined.

### To extract path data

1. Select the path that you wish to extract data from.

#### Note

*You may only extract data for one path at a time.*

2. Click the **Properties** button on the AutoTrack toolbar. Select the **Path Notes** tab and click the **Extract Data** button. The Save As dialog will appear.
3. Select the file type (comma delimited or tab delimited), name the file and browse to the save location.
4. Click **Save** to confirm.
5. The file will contain the following data in columns:-

```
STEPNUM  
POSITION X  
POSITION Y  
POSITION Z  
DISTANCE  
MAX STEERING ANGLE  
MIN STEERING ANGLE  
ACTUAL STEERING ANGLE  
PERCENTAGE OF MAX STEERING ANGLE  
DIRECTION  
SPEED  
...
```

### Reading extracted data in Excel

The following is presented as a demonstration of how easy it is to obtain graphical plots of AutoTrack path data in Excel 2007. The procedure will vary in other spreadsheet programs.

1. Generate a short path with an articulated vehicle and extract the data as described in the previous section.
2. Open Excel.
3. Open the CSV file containing your extracted path data.
4. Select the columns labelled **Actual Steering Angle** and **Unit 1-2 Articulation Angle** by clicking on the column letter designator.
5. Select the **Insert** ribbon panel.
6. Select **Line** from the **Chart** panel.
7. Select one of the line graph types. A graph will be inserted showing steering angle and articulation angle varying with distance along the path. Select and right click to change the chart type or edit the formatting options.

# Swept Paths: Creating and editing vehicles

Although AutoTrack includes a wide range of predefined vehicles there will be cases where you will need a vehicle that is not listed. Between them, the Vehicle Wizard and the Advanced Editor allows you to create or edit almost any vehicle. And if you use your own vehicles regularly you may wish to create your own library of vehicles.

---

## AutoTrack vehicle libraries

AutoTrack is provided with a number of vehicles whose dimensions and characteristics have been pre-defined and which can be used immediately. In the UK version these vehicles are provided in a file called `UK_xxx.ATL`, where `xxx` is the most recent version of AutoTrack that can read it, e.g. `UK_700.ATL`. Such collections of vehicles are referred to as vehicle libraries. Additional vehicle libraries are available for different markets and can even be created by users themselves. However, to ensure that vehicle details do not change arbitrarily, there are restrictions on who can edit them. These restrictions require that users identify themselves if they wish to access a library to make changes. No password is needed simply to use a vehicle contained therein.

### Access to vehicle libraries

Access to libraries is restricted using a username / password system such that before a library can be opened for editing they must enter his or her name and password. Only if the user is authorised will they be allowed to open the library. There are three levels of access:-

#### **None**

You may list the vehicles but cannot access the details. This is the status of any libraries that have not been purchased.

#### **Read Only**

You may use the vehicles but may not change them or add new vehicles. All libraries are initially opened Read Only.

#### **Full Access**

You may use, copy, edit, or create new vehicles and add or edit the users.

All Savoy vehicle libraries are Read Only.

## Access to vehicles in the Pool

Vehicle once in the Pool may be edited unless they have been driven. As soon as a vehicle is used in a path it can no longer be edited; it can however be copied and the copy edited.

### Note

*If you make a copy of a vehicle in the same library it's name (and those of all it's units) are prefixed with the words 'Copy of ' to distinguish it from the original vehicle.*

---

## Compatibility with previous versions

AutoTrack can read vehicle library files back as far as AutoTrack 2, as well as WinTrack 2.x library files. It can also read AutoCAD drawings that contain data generated by earlier versions of AutoTrack and the vehicles contained therein. However, it cannot report upon or manipulate path data generated by earlier versions of either product.

## Loading AutoTrack 2.x vehicle libraries

If you want to load v2.x libraries you will need the vehicle files and the corresponding library definition file (extension `.DEF`). If you do not have this file, then create a text file in the following format:-

```
{LIBRARY NAME}  
{VEHICLE FILE NAME}  
{VEHICLE FILE NAME}  
{VEHICLE FILE NAME}  
etc....
```

Where {VEHICLE FILE NAME} is the AutoCAD drawing file name (without the extension). So if you want to load an old library called "Any Old Library" consisting of three vehicle files, `CAR.DWG`, `BUS.DWG` and `TRUCK.DWG` then your DEF file should look like this:-

```
Any Old Library  
CAR  
BUS  
TRUCK
```

### To load an AutoTrack 2.x library

1. Place the DEF file along with the DWG files in the AutoTrack Library subdirectory.
2. Open the library explorer.
3. Right click and select **Open Library** from the menu.
4. Change the file type to AutoTrack 2.x and browse to find the DEF file.
5. Highlight the file and click **Open**.
6. The library will appear in the explorer as Imported AutoTrack v2.x vehicle library.
7. Right click and select **Save Library As** from the menu.
8. Name the file and click **Save**.

## To load an AutoTrack 2.x vehicle

1. If you want to load just one vehicle or don't have the DEF file you can load individual AutoTrack 2.x vehicles into AutoTrack.
2. Make a copy of the AutoTrack 2.x vehicle file (the DWG file).
3. Load the AutoTrack 2.x vehicle file into AutoCAD.
4. Open the library explorer.
5. The AutoTrack 2.x vehicle will be listed in the Pool.
6. If you want to save the vehicle for future use then create a new library, drag the vehicle into it and save the library.
7. AutoTrack can be used alongside AutoTrack v2.x but not v3.x.

### Important

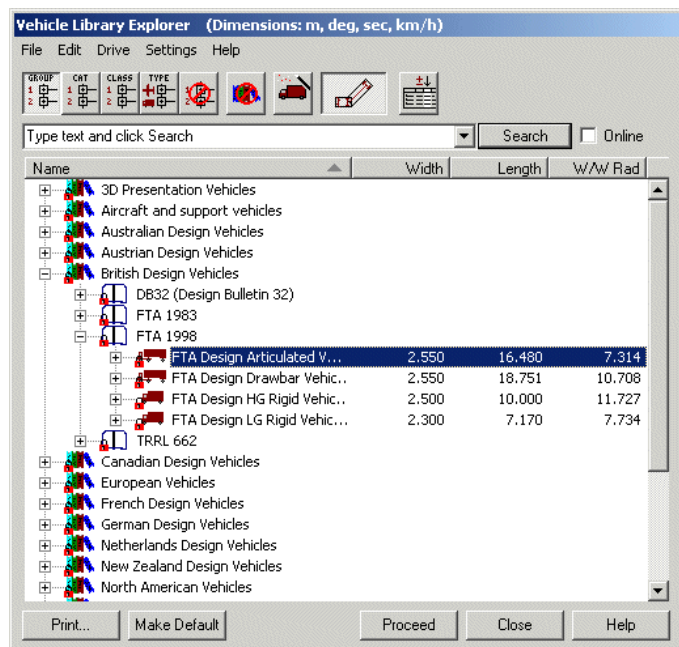
*Because AutoTrack v2.x made no distinction between front and rear axles AutoTrack assumes that the actual wheelbase is the greatest distance between any two adjacent axles. It is possible that this assumption may be incorrect in a few cases.*

## Viewing a vehicle in a library or the pool (Library Explorer dialog) <sup>(3510)</sup>



Vehicle Library button

1. Select Vehicle Library from the AutoTrack menu or click the **Vehicle Library** button on the AutoTrack toolbar. The Library Explorer will appear.



Library Explorer dialog



Group by Vehicle Group button



Group by Vehicle Category button



2. If the library that you require is not loaded then select **Open Library** from the **File** menu in the Library Explorer, browse to find the library and click **Open**. A new Vehicle Library icon will appear in the Library Explorer with the name of the library beside it.
3. The grouped buttons at the top of the Explorer dialog represent display group options. Click the **Group by**

Group by Vehicle  
Classification button



Group by Vehicle Type  
button



Do Not Group button



Hide Library Level button



Insert/Remove Columns  
button



Vehicle Wizard button



Vehicle Diagram button

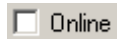
**Vehicle Group** button, **Group by Vehicle Category** button, **Group by Vehicle Classification** button **Group by Vehicle Type** button or **Do Not Group** button to list the vehicles grouped accordingly when the library is expanded.

4. Click the **Hide Library Level** button to display all vehicles from all libraries together.
5. Click on the + symbol to expand the library or the pool.
6. Click the + symbol adjacent to the required by group, category or classification if necessary.
7. The arrow on the header bar allows you to list the data in ascending or descending alphanumeric order. Click on the arrow to change the order or click on another column header to sort by another item of data.
8. Below the buttons is an editable list box that allows you to search for text in all open vehicle libraries. Simply type the text in the field and click the **Search** button. The last 20 searches are saved and can be recalled by clicking on the arrow at the right hand end.
9. You can also search and download vehicles from the Savoy website using the **Online Vehicle Library Explorer**. To do this enter any required search text, tick the **Online** checkbox and click the **Search** button. See [Finding vehicles online \(Online Vehicle Library Explorer\)](#)<sup>3580</sup>.
10. You can add or remove data from the display by clicking the **Insert/Remove Columns** button. See [Finding vehicles online \(Online Vehicle Library Explorer\)](#)<sup>3580</sup>.
11. Highlight the required vehicle (indicated by a vehicle symbol dependant upon its type) and select **Edit** (or **View** if the Library is locked) from the Edit menu. The Vehicle Details dialog will appear.
12. If you wish to edit a Vehicle Group then highlight it and select **Edit** (or **View** if the Library is locked) from the **Edit** menu in the Library Explorer. The Vehicle Group dialog will appear.
13. To create a new vehicle or edit or view an existing vehicle using the vehicle wizard click the **Vehicle Wizard** button. For more details refer to [The Vehicle Wizard](#).
14. To print a library, vehicle group or vehicle, select **Print** from the File menu or click the **Print** button. For more details refer to [Printing library or vehicle details \(Print dialog\)](#)<sup>5070</sup>.
15. Click the **Vehicle Diagram** button to display a picture of the current vehicle in a window adjacent to the Library Explorer. See [Vehicle Diagram dialog](#)<sup>3570</sup>.

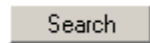


---

## Finding vehicles online (Online Vehicle Library Explorer)<sup>3580</sup>



Online checkbox



Search button

1. From the Vehicle Library Explorer, tick the **Online** checkbox and click the **Search** button to display the **Online Vehicle Library Explorer**.
2. The online libraries of vehicles are displayed hierarchically in much the same way as the local libraries. Click on the + symbol to expand a level or on the – to collapse it.
3. Once you are at vehicle level the same data columns are displayed as on the local Library Explorer. If you change the local data columns the online columns will change too.
4. You can change your search criteria without going back to the Library Explorer, simply enter the text in the box at the top and click **Search**.
5. At the left hand end of each vehicle there is a checkbox and thumbnail image. Tick the checkbox to select the vehicle for download to your PC. If you are not sure then move the cursor over the thumbnail to see a larger image with all the data. Click on the thumbnail image to keep the vehicle details on screen while you continue looking. If you click on another thumbnail then that image and data replaces the previous data.
6. Once you have selected your required vehicle(s) click the **Download** button. The vehicle(s) will be copied to your hard disk and will appear in a special library called **Downloaded Vehicles**. These are now accessible even without an internet connection.

### Note

*Anyone can browse the online libraries but you will need a current support, maintenance and updates contract to download them for use.*

---

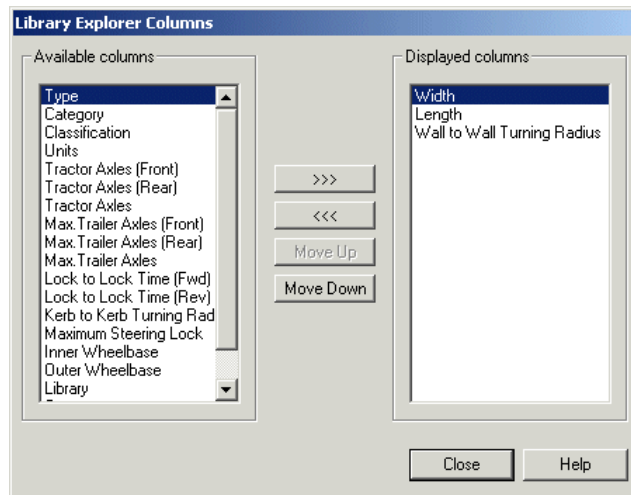
## Customising the Library Explorer view (Library Explorer Columns dialog) <sup>(3515)</sup>

By default the Library Explorer lists the vehicles sorted alphabetically by library along with the length, and width of each vehicle. However, you can modify this to suit your preference and requirements.

1. To add or remove columns from the Library Explorer view click the **Insert/Remove Columns** button. The Library Explorer Columns dialog will appear.



*Insert/Remove Columns button*



Library Explorer Columns dialog

2. The column on the left lists available data items and the column on the right, those that you currently have selected. To add a column to the display, highlight the data item on the left and click the **>>>** button. To remove a column, highlight the data item on the right and click the **<<<** button.
3. To change the positions of a column in the dialog, highlight the entry in the right hand column and click **Move Up** or **Move Down** as desired.
4. Click Close to return to the Library Explorer.

## Vehicle Diagram dialog (3570)



Zoom Extents button



Zoom In button



Zoom Out button



Increase Steering Angle button



Decrease Steering Angle button



Increase Articulation Angles button



Decrease Articulation Angles button



AutoScale button



Show Datums button



Show Dimensions button



Show Loads button

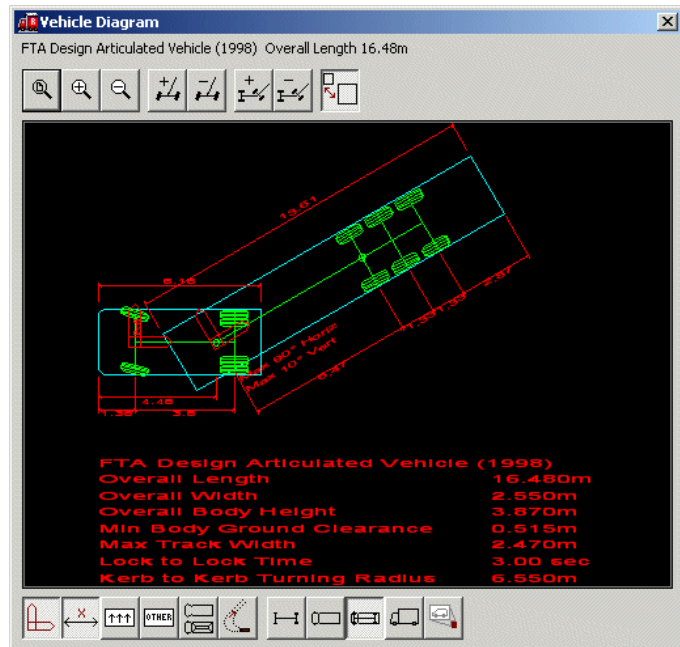


Show Other Outlines button



Show Simple Body Outlines button

1. The Vehicle Diagram dialog shows a scale picture of the current vehicle. Initially the picture is centred on the geometric centre of the vehicle but you can change the focus by simply clicking on the picture.



Vehicle Diagram dialog

2. The principle dimensions are listed below the diagram.

### Note

**Overall Width** follows the general convention and excludes the width of wing mirrors.

3. Click the **Zoom In** button to double the view scale and the **Zoom Out** button to halve the view scale. Note that using either command disables the AutoScale feature (see below).
4. Click the **Zoom Extents** button to restore a full size view of the entire vehicle. Using this command re-enables the AutoScale feature (see below).
5. You can increase or decrease the steering angle shown using the **Increase Steering Angle** button and **Decrease Steering Angle** button respectively.
6. Likewise the articulation angles can be changed with the **Increase Articulation Angles** button and **Decrease Articulation Angles** button respectively.
7. Depress the **AutoScale** button if you want the picture to zoom to extents when you highlight a new vehicle. You may disable this to make it easier to see the relative sizes of the vehicles as you scan through a library. This option is automatically disabled if you zoom in or out manually but is re-enabled if you zoom to extents.
8. Depress the **Show Datum** button to display the reference datum for each unit. This also shows the location of the



Show Turn Template button



Show Body button



Show Chassis button



Show All button



Show Elevation button

driver or pilot.

9. Depress the **Show Dimensions** button to display dimensions on the diagram.
10. Depress the **Show Loads** button to display load outlines and/or the **Show Other Outlines** button to display any and all other outline types.
11. Depress the **Show Simple Body Outlines** button to hide the detailed outline and display just a silhouette of the vehicle.
12. Depress the **Show Turn Template** button to show 30, 60, 90, 120, 150 & 180 degree turn templates for *front steered vehicles only*. For details of how to print these templates refer to [Printing library or vehicle details \(Print dialog\)](#) <sup>(5070)</sup>.

#### Note

You can also create Turn Templates using the Template Generator. See [The Template Wizard](#).

13. Click the **Show Body** button to display just the bodies, **Show Chassis** button to see just the chassis elements or **Show All** button to see both. The colours are the default colours used for reporting. Click **Show Elevation** to display a side view of the vehicle.

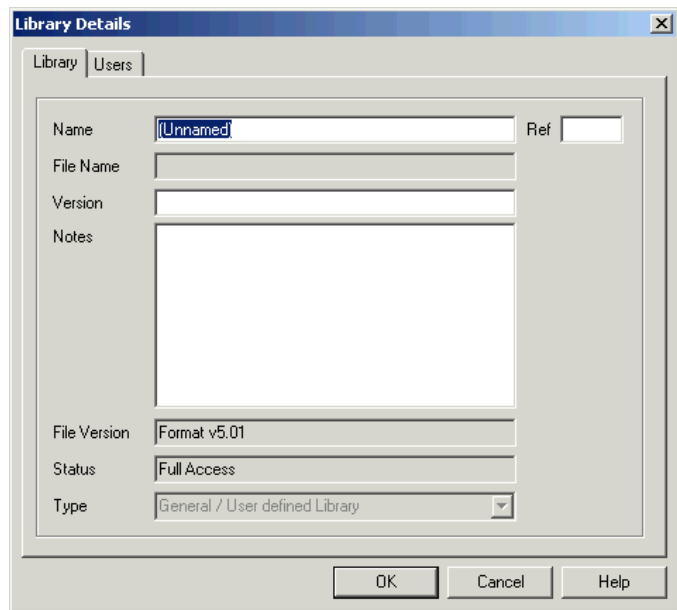
---

## Creating a new library (Library Details dialog) <sup>(3520)</sup>



Vehicle Library button

1. Select Library, Explore from the AutoTrack menu or click the **Vehicle Library** button on the AutoTrack toolbar. The Library Explorer will appear.
2. Select **New Library** from the File menu in the Library. The Library Details dialog will appear.



Library Details dialog

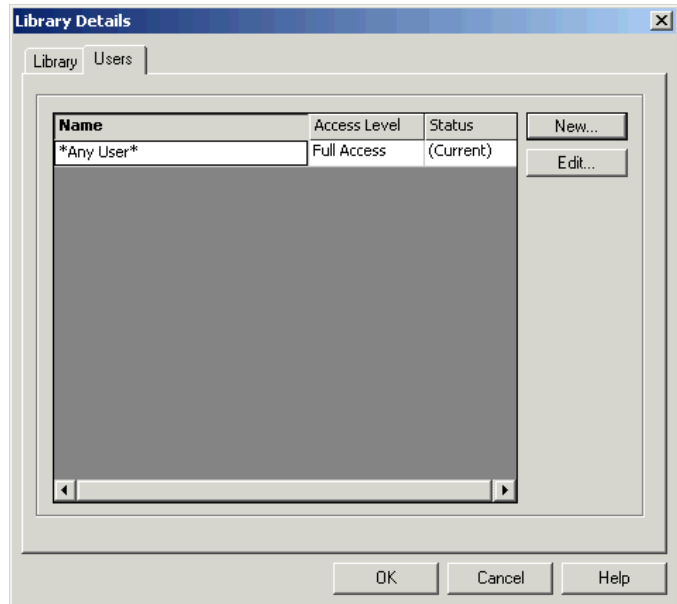
3. Click the appropriate tab to edit or view the settings.
4. Edit the data as required and click **OK** to confirm when you are satisfied. Click **Cancel** to abort all changes and close the dialog.

### Library Details: Library

1. Click the **Library** tab.
2. Give the library a meaningful **Name**.
3. The **Version** and **Notes** fields are provided for additional information and may be used at your discretion.
4. The **File Name** is read only and will be filled in when the file is saved.

### Library Details: Users <sup>(3530)</sup>

20. **Note**  
*You may only add new users or edit existing users in libraries to which you have full access rights.*
1. Click on the **Users** tab.



Library Details: Users

2. On a new library all users have full access as indicated by the default entry in the Users table. At least one user in the table must have full access before you may downgrade the default Any User rights.

### ***To add a new user***

1. On the Library Details dialog click **New**. The New User dialog will appear.

New User dialog

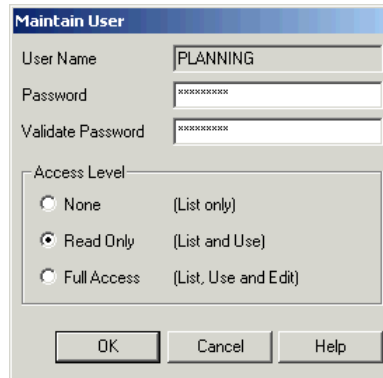
2. Enter the new **User Name**. Depending upon how you want to restrict access, this may be a specific person or a department name.
3. Enter the **Password** and then repeat it in the **Validate Password** field. This checks that you typed the password correctly. If you do not enter a password the named user will be able to unlock the library without typing a password.
4. Finally set the **Access Level**. We recommend that you add any users that you want to have full access and then downgrade the default Any User to Read Only.
5. Even tighter restrictions can be placed by downgrading Any User to No Access and adding Read Only users as required. However, this may prove problematic in practice.

## To edit an existing user (*Maintain Users dialog*) <sup>(3560)</sup>

21. **Note**

*You may only add new users or edit existing users in libraries to which you have full access rights.*

1. On the Library Details dialog highlight the user that you wish to edit and click **Edit**. The Maintain User dialog will appear.



Maintain User dialog

2. Change the **Password** and / or set a new **Access Level** and click **OK** to confirm. If you do not enter a password the named user will be able to unlock the library without typing a password.
3. Click **Cancel** to abort any changes.

**Note**

*You cannot delete users; instead you must set their access level to None.*

---

## Saving a library



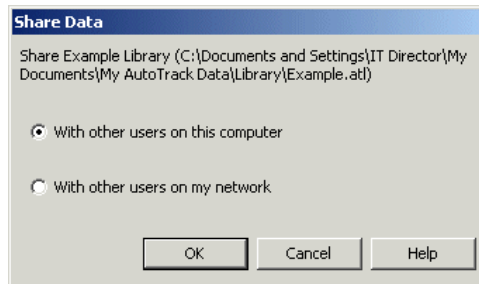
Vehicle Library button

1. Select **Vehicle Library** from the AutoTrack menu or click the **Vehicle Library** button on the AutoTrack toolbar. The Library Explorer will appear.
2. Highlight the library that you want to save, right click and select **Save Library As** from the drop down menu that appears.
3. The Save Library As dialog will appear. Browse to the required storage directory, enter the filename and click **Save**.
4. If the library already has a name then you can use **Save Library**.

---

## Sharing a library (Share Data dialog)

1. In the Library Explorer highlight the library that you want to share, right click and select **Share Library** from the drop down menu that appears.
2. The Share Data dialog will appear.



Share Data dialog

3. Select who you want to share the library with and click **OK**.

If you select **With other users on this computer** a copy will be placed in the public data directory on your computer.

If you select **With other users on my network** a copy will be placed in the shared data directory (if one is defined).

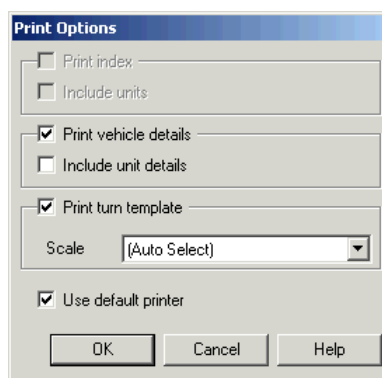
---

## Printing library or vehicle details (Print dialog) <sup>(5070)</sup>



Vehicle Library button

1. Select **Vehicle Library** from the AutoTrack menu or click the **Vehicle Library** button on the AutoTrack toolbar. The Library Explorer will appear.
2. Highlight the library, vehicle group or vehicle that you want to print and click the **Print** button at the bottom. The Print Options dialog will appear.



Print Options dialog

3. Tick **Print index** to print an index listing the vehicles and **Include units** if you want the index to include the names of the units.

### Note

*These options are disabled if you selected a vehicle.*

4. Tick **Print vehicle details** to print details for the selected



vehicles including a dimensioned scale diagram.  
Tick **Include unit details** if you want full details of every unit.

5. Tick **Print turn template** to print 30, 60, 90, 120, 150 & 180 degree turn templates for the selected vehicles. Select the scale from the drop down list box or let AutoTrack select it for you. Note that the printed output includes a check point to allow you to check for stretching of the paper.
6. Tick **Use default printer** if you do not want to see the printer settings when you click **OK** and then click **OK** to proceed.
7. The Print dialog will appear if you did not opt to use the default printer. Adjust the printer settings if necessary and click **OK**.

---

## Copying vehicles and units using drag and drop

Vehicles are automatically copied to the Pool when they are driven but you may wish to edit a vehicle before driving it or indeed build your own library of frequently used vehicles.

To copy a vehicle to the pool, select it, drag it over the Pool symbol and drop it. If you wish to copy it to another library you will need full access rights in the destination library. The cursor will change to a no entry symbol to indicate areas where you may not drop the vehicle.

You can also make copies of vehicles within libraries in the same way; in this case the names of the vehicle and its constituent units are prefixed with the words 'Copy of ', to distinguish them from the originals. If you drag a vehicle to a new group within the same library it will be moved (not copied). If you want it to be copied then hold down the **<Ctrl>** key while you drag. This is basically the same functionality as you will be familiar with in Windows Explorer.

Units may be copied in the same way but can only be copied to another vehicle. Select the unit and drag and drop it over the required vehicle. The unit will be added to the end of the vehicle but may be moved forward by editing the vehicle details.

Entire vehicles can also be added to the end of other vehicles in the same way. In this case all the units that make up the dragged vehicle are added to the end of the target vehicle.

---

## Building vehicles using drag and drop

Using the drag and drop facility new vehicles can be constructed from existing vehicles quite quickly. However, be sure to check that the articulation angles between units are appropriate for your new vehicle.

### Using tractors as trailers

If you drop a tractor type unit onto another vehicle its type AutoTrack will change its type to Tractor used as trailer. AutoTrack will then ignore the steering limits of the tractor when the vehicle is driven. It will also check that a coupling exists at the rear of the existing vehicle and at the front of the dropped tractor. In most cases you should not need to make any further changes to the vehicle. However, if it was necessary for AutoTrack to add couplings you might need to edit the coupling details.

### Towbar type aircraft tugs

To model aircraft being towed with a towbar type tug you will need to change the front axle type to Drawbar. You will also need to set a front coupling at the end of the drawbar.

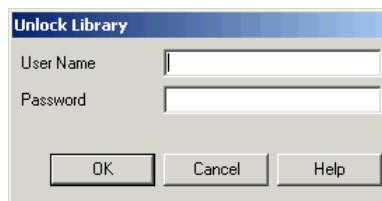
### Towbar-less aircraft tugs

If using the drawbar-less type of tug you should set the articulation limits for the coupling to the maximum nosewheel angle.

---

## Unlocking a library (Unlock Library dialog) <sup>(3550)</sup>

1. Highlight the library that you want to unlock, right click and select **Unlock Library** from the drop down menu that appears. If a password has been set for the library, the **Unlock Library** dialog will appear. Otherwise, the library will be unlocked and you should refer to step 3.



Unlock Library dialog

2. Enter your **User Name** and **Password** and click **OK**.
3. You will be granted whatever rights you have within the library. Thus, if you have full access rights within the current library then you will be able to edit vehicles in the unlocked library; if, on the other hand you only have read only rights then you will only be able to drive and copy the vehicles.

---

## Creating a new group



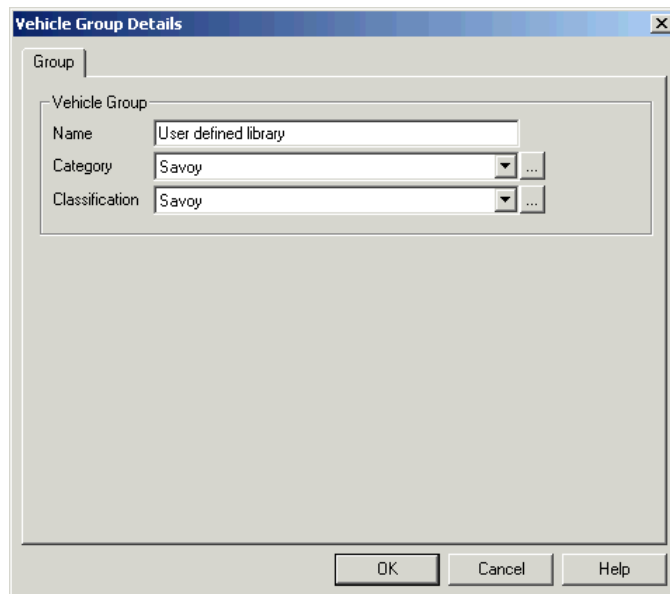
Vehicle Library button

1. Select **Vehicle Library** from the AutoTrack menu or click the **Vehicle Library** button on the AutoTrack toolbar. The Library Explorer will appear.
2. Highlight the library that you want to add a group to.
3. Right click and select **New, Group** from the menu. The [Vehicle Group dialog](#) will appear.
4. Edit the details and click **OK** to confirm.

---

## Vehicle Group dialog (4040)

1. The Vehicle Group dialog lists the vehicle group details.



Vehicle Group dialog

2. Edit the **Name**, **Category** and **Classification** as required and click **OK** to confirm.

---

## Viewing a vehicle used on a particular path



Properties button

1. Select the path and select Properties, Path from the AutoTrack menu or click the **Properties** button on the AutoTrack toolbar.
2. Click the **Vehicle** tab. The [Vehicle Details dialog](#) will appear.

---

## Viewing or editing an existing vehicle



Vehicle Library button



Vehicle Wizard button

1. Select **Vehicle Library** from the AutoTrack menu or click the **Vehicle Library** button on the AutoTrack toolbar. The Library Explorer will appear.
2. Highlight the vehicle whose details you wish to view or edit. Note that you cannot edit Savoy library vehicles or vehicles in other locked libraries directly but you can view their details or edit a copy.
3. Click the **Vehicle Wizard** button or right click and select **Edit** (or **View** if the vehicle is locked) from the menu that appears. The Vehicle Wizard will appear (see [The Vehicle Wizard](#)).
4. To edit a locked vehicle (e.g. a library vehicle) highlight it right click and select **Edit a Copy**. AutoTrack will make a copy of the vehicle in the Pool and open it in the Vehicle Wizard.

---

# Creating vehicles

By default new vehicles are created using the Vehicle Wizard. However, you can switch to the advanced editor from any page of the wizard and once the vehicle is created you can even start editing in the advanced editor if you prefer.

## To create a new vehicle



Vehicle Library button



Vehicle Wizard button

1. Select **Vehicle Library** from the AutoTrack menu or click the **Vehicle Library** button on the AutoTrack toolbar. The Library Explorer will appear.
2. Make sure that the cursor is not on a vehicle, then right click and select **New, Vehicle** from the menu that appears or click the **Vehicle wizard** button.

### Note

*All new vehicles are created in the Pool even if the cursor is over an editable library or vehicle group. This minimises the risk that you corrupt an existing library.*

3. The Vehicle Wizard will appear (see [The Vehicle Wizard](#)).

---

# The Vehicle Wizard

The Vehicle Wizard allows you to define simple vehicles. The wizard cannot edit the following:-

More than 7 units  
Non-identical axles  
Different front and rear lock to lock times  
Steering linkages  
Self-steered or retracted axles

If you try to edit a vehicle that has more than 7 units you will be placed in the advanced editor.

On every page of the wizard there is an **Advanced** button that takes you to the advanced editor. If you wish to edit data that falls into one of the above categories go to the advanced editor then return to the wizard.

Also on every page is a **Finish** button. This is only active for vehicles that are being edited and not for those being created for the first time.

The wizard displays different screens depending upon the vehicle type.

## Some tips for defining trams (Rail only)

All axles on a tram must, by definition, be guided. Each front or rear axle group is reduced to an effective contact point (ECP) and these are used to calculate the movement of the tram. However, it is not always easy to determine whether an axle, or its wheels, are fixed or free to turn, and if you define them incorrectly the tram may be undriveable. There are two rules that must be observed when defining a tram in order to avoid undriveable vehicles.

1. Each tram **must** have at least one unit with 2 guide points (i.e. a front axle group and a rear axle group) but this need not necessarily be at the end of the tram.
2. There must be only one guide point adjacent to each articulation point. For example, if you define a rear guide point (axle group) on unit 2 then there **must not** be a front guide point on unit 3; and conversely, if there is no rear guide point on unit 2 then there **must** be a front guide point on unit 3.

*Note that it is implicit in these rules that the first unit must have a front axle and the last unit must have a rear axle.*

You should consider the following when defining a new tram:

### Which unit is the 2-ECP unit ?

Most trams have a clear candidate for the required double ECP unit. However, if it is unclear you should bear in mind that a two axle bogie **cannot** be regarded as two separate contact points if the bogie articulates with respect to the unit chassis. If the bogie does not articulate with respect to the unit chassis then you can consider the centres of the two axles of the bogie as separate effective contact points.

### Where are the pivot points ?

The pivot points are where the tram chassis articulates. The tram chassis (and therefore the tram body) is assumed to be rigid between the pivot points.

## Vehicle wizard: Name <sup>(7000)</sup>

The screenshot shows the 'Vehicle Wizard' dialog box with the 'Name' tab selected. The title bar reads 'Vehicle Wizard'. Inside the dialog, there is a text box for 'Vehicle name' containing 'California Design Vehicle (15m MTCR, 2 Axle Trailer)', a text box for 'Source of data' which is empty, and a text box for 'Description' containing 'Design vehicle'. Below these is a dropdown menu for 'Vehicle type' set to 'Articulated vehicle'. At the bottom left is a spinner box for 'Number of units' set to '2', with a note '(a drawbar trailer counts as one unit)'. At the bottom right is an 'Advanced...' button. At the very bottom are five buttons: '< Back', 'Next >', 'Finish', 'Cancel', and 'Help'. A small instruction 'Click Next to continue' is located above the 'Advanced...' button.

### Vehicle Wizard: Name tab

1. Enter the vehicle **Name**, **Description** and **Source**. Even though the **Description** and **Source** fields are not compulsory we nevertheless recommend that you complete them since they are useful reminders when you come to reuse the vehicle at a later date.
2. Enter the **Vehicle type**. You may select from a variety of steered vehicles, an aircraft or a tram. You may not select a vehicle type Tram if you have not purchased the Rail version. Likewise, you may only select a vehicle type Tram if you only have a licence for the Rail version. Your selection here affects the data you have to supply. For example, if you select a tram your vehicle will have rail type wheels and you will be asked for details of the pantograph.
3. Enter the **Number of units**.

#### Note

*A unit with a drawbar front axle is regarded as a single unit.*

4. Click the **Advanced** button to go to the Vehicle Details dialog.
5. Click **Next** to move to the next page.

#### Note

*Throughout the wizard, if you have an invalid value you will not be permitted to go to the next page. You can, of course, also move backwards through the wizard using the Back button but note this is not a cancel button and retains any edits that you make on the current page.*

## Vehicle wizard: Axles <sup>(7010)</sup>

**Tractor Axles**

The wizard assumes that new axles are identical and either Ackerman steered or fixed. To define non-identical axles or to add self steered or retracted axles click the Advanced button.

Number of front axles:

Front track width:  m

Wheels on each axle:

Number of rear axles:

Rear track width:  m

Wheels on each axle:

Click Next to continue

Advanced...

< Back   Next >   Finish   Cancel   Help

Vehicle Wizard: Axles tab

1. Enter the **Number of front axles**. The first unit must have at least a front axle and the last unit must have at least a rear axle.
2. **Drawbar trailers**: If you specify front axles on the trailer of a steered vehicle the wizard assumes you want a drawbar.
3. **Self-steered / retracted axles**: Click the **Advanced** button to use the advanced vehicle editor and tick the **Self-steered** and / or **Retracted** box on the relevant axles.
4. **Steering linkages**: Click the **Advanced** button to use the advanced editor and tick the **Linkage** box.
5. Enter the **Wheels on each axle**. This is the total number of wheels on each axle so if there is only one wheel on each side you should enter 2 in this field. Wheels are generally assumed to be at the ends of the axles except for aircraft main undercarriage wheels which are at specified spacing.
6. **Evenly spaced or specified spacing wheels**: Click the **Advanced** button to use the advanced vehicle editor and select **Evenly spaced** or **Specified spacing** from the wheel position drop down box on each axle.
7. Enter the **Front track width**. All axles are assumed to be identical. Track width must be non-zero.
8. **Non-identical track widths**: Click the **Advanced** button to use the advanced vehicle editor and set the **Outer face wheel track** on each axle.
9. Do the same for the rear axles.
10. Click **Next** to move to the next page.

## Vehicle wizard: Wheelbase (7020)

**Tractor Wheelbase**

The wheelbase and axle spacing of a unit are the main factors in how much it will cut in. A unit with a long wheelbase and a single axle may have the same cut-in as a unit with a shorter wheelbase but several widely spaced axles.

Wheelbase  m

Rear axle spacing  m

Click Next to continue

Advanced...

< Back Next > Finish Cancel Help

Vehicle Wizard: Wheelbase tab

1. Enter the **Wheelbase** - the distance between the innermost front and rear axles (or, if there are only axles at one end between the axles and the coupling at the other end). AutoTrack automatically calculates the centroids of the axle groups to calculate the effective wheelbase.
2. **Manual setting of the effective wheelbase:** Click the **Advanced** button and use the advanced editor to set the effective front and / or rear axle offset.
3. If you have more than one front or rear axles then you must enter appropriate values for **Front axle spacing** and **Rear axle spacing**. This is the distance between any two adjacent axles. The wizard assumes that the axles are evenly spaced, i.e. that the distance between all pairs of adjacent axles is the same.
4. **Unevenly spaced axles:** Click the **Advanced** button and use the advanced editor to set the offset of each axle.
5. Click **Next** to move to the next page.



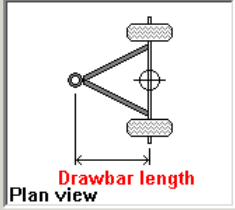
## Vehicle wizard: Drawbar <sup>(7050)</sup>

**Trailer 2 Drawbar**

Drawbar dimensions are measured relative to the axle group pivot point.

Length of drawbar  m

Drawbar articulation angle  deg



Click Next to continue

Advanced...

< Back   Next >   Finish   Cancel   Help

### Vehicle Wizard: Drawbar tab

1. Any steered vehicle trailer that has front axles is assumed to be a drawbar trailer.
2. The **Length of drawbar** is measured from the coupling to the preceding unit to the centre of the axle pivot.
3. The **Drawbar articulation** angle must be non-zero.
4. Click **Next** to move to the next page.

## Vehicle wizard: Steering (not Rail) <sup>(7030)</sup>

The rate at which a vehicle can turn is determined by the time it takes to turn the steered wheels from lock to lock. This is assumed to be the same going forwards as reverse.

Steering: Front Axle

Lock to lock time: 4 sec

Click Next to continue

Advanced...

< Back Next > Finish Cancel Help

Vehicle Wizard: Steering tab

1. Most vehicles will have front wheel steering but if your vehicle is one of the exceptions then select Rear Wheels or even Rear Coupling from the **Steering** drop down box.
2. Enter a value for the **Lock to lock time**. This is assumed to apply when the vehicle travels forwards or backwards and must be non-zero.
3. **Different lock to lock rates for forwards and reverse**: Click the **Advanced** button and use the advanced editor.

### Tip

*Lock to lock time is a term that Savoy Computing introduced way back in the eighties. Whilst it is a useful way to describe the steering characteristics of a vehicle it is nevertheless a parameter that is little used in the motoring industry. Far more common is the number of turns of the steering wheel lock to lock. Clearly the two parameters are closely related and it may be useful when defining new vehicles to think in terms of number of turns lock to lock. Of course the time it takes to complete one turn of the wheel may vary between vehicles according to steering wheel size, resistance to turning and other factors.*

4. Click **Next** to move to the next page.

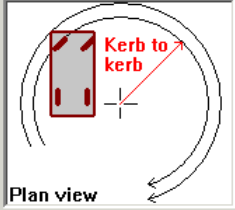
## Vehicle wizard: Manoeuvrability <sup>(7040)</sup>

**Tractor Manoeuvrability**

The minimum turning circle radius (MTCR) determines how tight the unit can turn. It is commonly specified on manufacturers data sheets as either between kerbs or between walls. Otherwise, specify the max physical or virtual steering angle.

☒ Turning radius measured kerb to kerb  
☐ Turning radius measured wall to wall  
☐ Maximum wheel angle (physical)  
☐ Maximum steering angle (virtual)

Minimum turning circle radius  m



Click Next to continue

Advanced...

< Back   Next >   Finish   Cancel   Help

### Vehicle Wizard: Manoeuvrability tab

1. Most source specify vehicle turning as either kerb to kerb radius or wall to wall radius. However it can also be specified as a maximum wheel angle or as a steering angle. Select the appropriate option and enter either the turning radius in the **Minimum Turning Circle Radius** field or the angle in the **Maximum Angle** field. Either must be greater than zero.
2. Click **Next** to move to the next page.

## Vehicle wizard: Couplings <sup>(7060)</sup>

**Tractor Couplings**

You cannot remove intermediate couplings but you can adjust their locations and articulation angles. Couplings are all assumed to be fixed. To add a special type of coupling click the Advanced button.

This unit has a front coupling ☐

Front coupling offset  m

Maximum articulation angle  deg

This unit has a rear coupling ☒

Rear coupling offset  m

Maximum articulation angle  deg

Click Next to continue

Advanced...

< Back   Next >   Finish   Cancel   Help

Vehicle Wizard: Couplings tab

1. The wizard automatically adds a front coupling to all trailers and a rear coupling to all preceding units. The **Coupling offset** is measured from the innermost rear axle.
2. You may add an additional front coupling to the front unit or a rear coupling to the last unit if you wish.
3. The Maximum articulation angle must be non-zero.
4. Click **Next** to move to the next page.

## Vehicle wizard: Body <sup>(7070)</sup>

Vehicle Wizard: Tractor Body

The Rear Overhang is measured from the innermost rear axle. N.B. If the rear of the body is in front of the rear axle then the rear overhang will be negative.

Body length  m

Body width  m

Rear overhang  m

Add wing mirrors ☐

Body style

Click Next to continue

Advanced...

< Back Next > Finish Cancel Help

Vehicle Wizard: Body tab

1. Enter values for the **Body length** and **Body width**. Both must be greater than zero. You will be warned if the body comprises multiple shapes and given the opportunity to reduce them to a simple bounding rectangle.
2. **To create or edit bodies made up of multiple shapes:** Click the **Advanced** button to use the advanced editor and edit the shapes as necessary.
3. The **Rear Overhang** is measured from the innermost rear axle (or the rear coupling if there is no rear axle) and may be negative if the back of the body is in front of the rear axle.
4. The vehicles are all supplied without wing mirrors defined. If you would like to see the effect of wing mirrors tick **Add wing mirrors**.

### Warning

*The default wing mirrors will not be ideal for all vehicles and we recommend that you check the location and size if they are critical in your scheme.*

5. Finally, select a **Body Shape** from the drop down list.
6. Click **Next** to move to the next page.

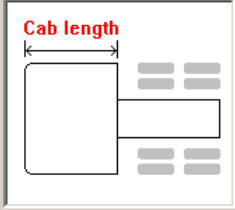
## Vehicle wizard: Tractor body <sup>(7075)</sup>

**Vehicle Wizard: Tractor Body (Detail)**

The articulated tractor body shape is visually more accurate but does not normally differ significantly from the path generated using a rectangular body shape.

Cab length \*  m

Chassis width \*  m



\* Dimensions marked thus have been automatically calculated. Enter a value to override. Enter zero to set default.

Click Next to continue

### Vehicle Wizard: Tractor Body

1. The Tractor body page allows you to create more realistic looking bodies for articulated vehicle haulers.
2. The **Cab length** is the length of the cab itself.
3. The **Chassis width** is the width of the chassis behind the cab.

## Vehicle wizard: Tram body (trams only) <sup>(7080)</sup>

Unit 1 Body end detail

Tram carriage bodies often have rounded or tapered ends. Use the fields on this page to define these refinements. To define a more precise outline click the Advanced button.

	Front	Rear
End radius	0	-0.85 m
Taper width	0.425	0 m
Taper length	2.1	0 m

Plan view

Click Next to continue

Advanced...

< Back   Next >   Finish   Cancel   Help

Vehicle Wizard: Tram body tab

1. By default tram bodies are rectangular. This tab allows you to define more accurate end shapes for your trams.
2. The **Taper width** is amount by which the end of the tram body narrows on each side at the end. For example, if the uniform body width is 2m and the end width is 1m then the taper width is 0.5m.
3. The **Taper length** is the distance from the start of the body width reduction to the end of the tram body.
4. If you specify a negative **End radius** the end of the tram will be concave (i.e. curved inwards instead of outwards). This is used on the trams we provide to represent the inter-car turntable at articulation points.
5. Click **Next** to move to the next page.

## Vehicle wizard: Aircraft wings (aircraft only) <sup>(7090)</sup>

**Aircraft Wings**

The wing tip leading edge offset is a critical dimension that has a significant bearing on the swept envelope. We recommend that you over-ride the default value with the specific value.

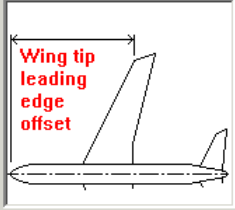
Wing tip leading edge offset \*  m

Wing root leading edge offset \*  m

Wing tip taper  m

Wing width at tip \*  m

Wing width at root \*  m



\* Dimensions marked thus have been automatically calculated. Enter a value to override. Enter zero to set default.

Click Next to continue Advanced...

< Back Next > Finish Cancel Help

### Vehicle Wizard: Aircraft Wings tab

1. All except one of the fields on this tab have default values based upon the length or span of the aircraft. We must stress that none of the default values should be regarded as recommended or accurate in any way. Some will be more critical than others and we encourage you to overwrite them with accurate dimensions.
2. The **Wing Tip Leading Edge Offset** is a particularly important dimension and can have a significant effect on the swept envelope.
3. Click **Next** to move to the next page.

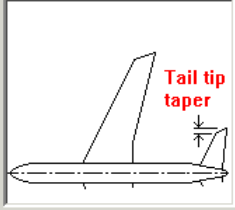


## Vehicle wizard: Aircraft Tailplane (aircraft only) (7100)

**Aircraft Tailplane**

Please do not accept the default values if you have accurate data available. To define or import a more precise outline click the Advanced button.

Tail span *	14.0448	m
Tail tip leading edge offset *	45.2602	m
Tail root leading edge offset *	41.5274	m
Tail tip taper	0	m
Tail width at tip *	1.8664	m
Tail width at root *	3.2662	m



\* Dimensions marked thus have been automatically calculated. Enter a value to override. Enter zero to set default.

Click Next to continue Advanced...

< Back **Next >** Finish Cancel Help

### Vehicle Wizard: Aircraft Tailplane tab

1. Again most of the fields on this tab have default values based upon the length or span of the aircraft. Whilst these dimensions are likely to be less critical than those of the wings, nevertheless we must stress that none of the default values should be regarded as recommended or accurate in any way and we encourage you to overwrite them with accurate dimensions.
2. Click **Next** to move to the next page.

## Vehicle wizard: Aircraft Fuselage (aircraft only) (7110)

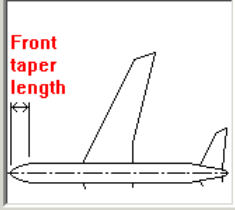
**Aircraft Fuselage**

Please do not accept the default values if you have accurate data available. To define or import a more precise outline click the Advanced button.

Fuselage width \*  m

Fuselage front taper length \*  m

Fuselage rear taper length \*  m



\* Dimensions marked thus have been automatically calculated. Enter a value to override. Enter zero to set default.

Click Next to continue

### Vehicle Wizard: Aircraft Fuselage tab

1. The dimensions on this screen are unlikely to be critical. Nevertheless, it is still worth entering accurate data.
2. Click **Next** to move to the next page.

## Vehicle wizard: Pantograph (trams only) <sup>(7120)</sup>

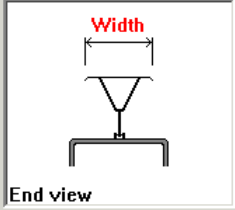
**Unit 3 Pantograph**

These fields are optional. If you supply the data you will be able to envelope the path of the pantograph head.

This unit has a pantograph pickup ☒

Pickup offset from front  m

Pickup width  m



End view

NOTE: To see the pantograph on the vehicle diagram click the Show Other Outlines button on the vehicle diagram.

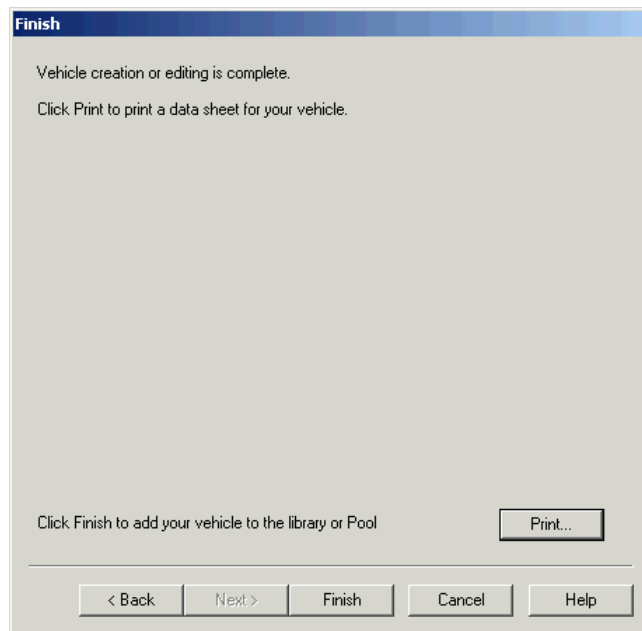
Click Next to continue Advanced...

< Back   Next >   Finish   Cancel   Help

### Vehicle Wizard: Pantograph tab

1. If the current tram unit has a pantograph pickup tick the box.
2. The **Pickup offset from front** is measured from the front of the tram body.
3. Click **Next** to move to the next page.

## Vehicle wizard: Finish <sup>(7130)</sup>



Vehicle Wizard: Finish tab

1. The Finish page allows you to print the details of your new vehicle. When you are ready click **Finish** to add the vehicle to the library or pool.

---

## The Advanced Editor

The advanced editor has fewer restrictions than the wizard and allows you to define details that may not be possible using the wizard. However, the wizard preserves advanced settings defined using the advanced editor and consequently you can safely switch between editors as the need arises.

---

## Vehicle Details dialog (4050)

The Vehicle Details dialog gives an overview of the complete vehicle, and lists the units that it comprises.

Unit	Name	Max Artic.
1 x	California Design Vehicle Tractor (15m MTC	N/A
2	California Design Vehicle 2-Axle Trailer	90

Vehicle Details dialog

1. The **Name**, **Type**, **Category** and **Classification** of the selected vehicle appear at the top of the dialog. Beneath that the units that comprise the vehicle are listed with the front unit at the top. Vehicle **Category** and **Classification** are merely sort criteria used in the Library Explorer and have no bearing on how the vehicle behaves. However, you will not be able to create vehicles of type tram unless you are licensed to use the AutoTram module; likewise you will not be able to create any of the various steered vehicle types unless you are licensed to use AutoTrack.
2. Click the button next to the **Name** field to enter **Source**, **Description** and **Notes**.
3. Select a unit and click the **View** or, if you have appropriate rights, the **Edit** button to check the details of a specific unit. The [Unit Details dialog](#) will appear.
4. Click **New** to add a Unit to the vehicle. This will display a blank unit details dialog for you to create a completely new unit (see [Unit Details dialog](#)). If you want to add an existing unit to the vehicle, then drag it onto the vehicle in the Library Explorer dialog.
5. Select a unit and click **Remove** to remove it from the vehicle.

6. You can reorder units using the **Move Up** button. Select a unit and click **Move Up**. The selected unit will be moved up one place.
7. The only editable column in the lower grid is **Max. Artic.**, the maximum articulation angle. This value is used in preference to those defined in the coupling details if it is lower.
8. The unit names can only be edited in the [Unit Details dialog](#).

## Unit Details dialog (4060)

The Unit Details dialog shows the detailed dimensions and parameters of individual units. When defining units we recommend that wherever possible you enter the actual dimensions and allow AutoTrack to calculate the effective dimensions.

1. Click on the appropriate tab to view or edit details.

The screenshot shows the 'Unit Details' dialog box with the 'Unit' tab selected. The title bar indicates '(Dimensions: m, deg, sec, km/h)'. The dialog has several tabs: Unit, Front Axles, Rear Axles, Steering, Body / Outlines, and Couplings. The 'Unit' tab contains the following fields:

- Name:** California Design Vehicle Tractor (15m MTCR)
- Type:** Tractor (with driver controlled steering)
- Body Style:** Articulated Vehicle Tractor (Large Sleeper Cab)
- Classification:** Savoy
- Datum:** Reference Datum: Front Primary Axle 1
- Front Axle:**
  - Innermost Front Axle (No.1): 0
  - Behind Datum: (Front Primary Axle 1)
  - Effective Front Axle Offset: 0 or Use Calculated Value of 0
- Rear Axles:**
  - Innermost Rear Axle (No.1): 5.5
  - Behind Datum: (Front Primary Axle 1)
  - Effective Rear Axle Offset: 5.5 or Use Calculated Value of 6.11

Buttons at the bottom include Print, OK, Cancel, and Help.

Unit Details dialog: Unit tab

2. Enter values in the fields provided and click **OK** to confirm and close the dialog.
3. Click **Apply** if you wish to confirm the changes but not close the dialog. Click **Cancel** to abort all changes since the last time you clicked **Apply**.

## Unit Details: Unit

1. Click on the **Unit** tab.
2. **Name** may be anything but make sure that similar vehicles with different drive characteristics are clearly identified to prevent incorrect use. Click the button next to the **Name** field to enter **Source**, **Description** and **Notes**.
3. **Unit Type** may be Tractor, Trailer, Tractor Used as Trailer, Towbar, Suspended Unit or Tram / Guided Unit:-

**Tractors** are always the driven (and steered) unit and must therefore have at least a front axle and steering characteristics. **Trailers** have no steering parameters and may front and rear or just rear axle groups.

Setting **Tractor Used as Trailer** forces AutoTrack to ignore the steering criteria for this unit and treat the remaining data as if it were a trailer.

**Suspended Units** have no axles and therefore no steering capability.

A **Tram / Guided Unit** is assumed to be guided by rails or similar and therefore has no steering capability. The unit may have front and / or rear axles or no axles but any axles must be guided.

A **Towbar** is essentially the same as a suspended unit and has neither front nor rear axles and no steering.

As you edit the Type the relevant data tabs will appear and disappear.

4. Vehicle **Category** and **Classification** are merely sort criteria used in the Library Explorer and have no bearing to how the unit behaves.
5. The **Datum** is the reference point for all dimensions on the unit. It may be set to the front most or rearmost point on the body, the front or rear primary axle, or the front or rear coupling.
6. If you unit has a front axle tick **Front Axle**. Likewise **Rear Axle**.
7. The distance from the datum to the **Innermost Front Axle** and **Innermost Rear Axle** must be specified. Obviously if the selected datum is one or other of these values then the appropriate dimension will be zero. The values are directional as indicated by the text that follows the field and the direction in which the unit is facing. You will not be able to edit the front axle offset if you have a drawbar front axle and a front coupling datum.

### Note

*The difference between the **Innermost Front Axle** offset and the **Innermost Rear Axle** offset is the **Actual Wheelbase** referred to in WinTrack v2.x.*

8. Both front and rear axle groups are equivalenced to single effective axles. The position of these effective axles is dependent upon a number of factors including the axle and steering geometry and the tyre dimensions. It is the effective axle positions that determine how the vehicle moves. By default AutoTrack calculates the positions of the effective axles for you but in some cases it is useful to specify the position manually.

**Note**

*Since the effective axle positions determine how the unit turns so we recommend that you allow AutoTrack to calculate the value in most cases.*

9. If you wish to set the **Effective Front Axle Offset** or **Effective Rear Axle Offset** manually then untick the relevant **Use Calculated Value** and enter the offset using the same direction convention as the Innermost Front Axle bearing in mind the direction drop down box.

**Note**

*You cannot manually specify an effective axle offset to an axle that is linked.*



## Unit Details: Front Axles / Rear Axles <sup>(4070)</sup>

1. Click on the **Front Axles** tab (or **Rear Axles** tab).

Unit Details (Dimensions: m, deg, sec, km/h)

Unit Rear Axles Body / Outlines Couplings

Axle Group Details (\* = default value)

Axle group type: Ackerman (axles fixed, wheels turn) Guided ☐

☒ Axles identical Generic tyred wheels 2nd Steer ☒ Steering...

☒ Uniform spacing 1.4 ☒ Wheel angle limited to 45

Drawbar length: 0 Maximum articulation angle: 90

Pivot offset: 1.4 Behind axle 1 Height: \* 0.875

Axles 1 to 3 (Identical)

Bogies per row: 2 Bogie spacing: \* 2.75000

Axles per bogie: 1 Bogie axle spacing: \* 1.31250

Bogie pivot offset: 0

Outer face wheel track: 2.5 Offset from previous axle: 0

Wheels per axle: 4 Wheels set: At ends of axle

Stub axle length: 0 Wheel spacing: \* 0.5

Tyre diameter: \* 0.875

Tyre width: \* 0.25 ☐ Fixed Forwards & Reverse

☐ Retracted

New... Insert Remove

Print OK Cancel Help

Unit Details dialog: Rear Axles tab

2. Select the **Axle group type** from the drop down list. If the axle group is steered then it is probably uses the Ackerman steering principle whereby each wheel turns a different angle consistent with travelling along concentric arcs (see the chapter on Theory). Trailers may have drawbar front axles. Rear axles for most vehicles are fixed; those that steer must be linked to either the front axle (if there is one) or the front coupling.
3. Tick **Guided** if the axle is guided by rails or kerbs.
4. Select the wheel type from the dropdown list. You can choose from **Generic tyred wheels**, **Aircraft wheels**, **Car wheels**, **Truck wheels** and **Rail wheels**. Note, the difference between the various tyred wheels will only be apparent when animating the vehicle in 3D.
5. Tick **All axles identical** if all the axles have the same basic dimensions. When you tick this box the values for all axles will be set to same as the currently displayed axle (i.e. not necessarily axle 1) and the axles will be set to evenly spaced at the current **Uniform axle spacing**. Multiple tabs will be reduced to a single tab with text similar to Axle 1 to 3 (Identical).
6. Tick **2<sup>nd</sup> Steer** if this axle group turns but the turn angle is linked to the turn angle of another axle group or coupling. A rear axle group is automatically linked to the front axle group, if one exists, or the front coupling articulation angle, if not. A front axle group is similarly automatically linked to either the rear axle group or coupling. A unit cannot have both front and rear axle groups linked. The primary axle group cannot have linked steering and neither can a fixed axle group.

### Warning

*If you create a linked Ackerman multi-axle group then even if you set a linkage ratio of zero some of the wheels will still turn reflecting the Ackerman axle type.*

7. Click the **2<sup>nd</sup> Steer** button to enter details of the steering linkage ratios. See [Unit Details: Axle Groups: Secondary Steering Details](#) <sup>(4090)</sup> below.
8. Tick **Uniform axle spacing** if all the axles in the group are the same distance apart and enter a value in the field. Identical axles are deemed to be evenly spaced.

### Note

*Although a default value is provided for the axle spacing we strongly recommend that you obtain an accurate figure and overwrite this.*

9. Tick **Wheel angle limited** if you know the maximum angle that any wheel in the group can turn and enter the angle in the field provided. Note that if the axle group is of the Ackerman type all wheels will turn by different amounts; in this case you should enter the greatest angle of any wheel in the group.

### Note

*You can only limit the turning of secondary steering or self-steered axles in this way. The primary steering limit may be adjusted on the Steering Details tab. See [Unit Details: Steering](#) <sup>(4150)</sup>.*

### Warning

*When the limiting wheel angle is reached the steering is recalculated based upon the value of the controlling or primary steering angle and the limiting angle. This tends to force the cut-in point towards the limited axle.*

10. If you are defining a drawbar axle group, then enter the **Drawbar length**. Note that the coupling (if any) at the end of the drawbar must be specified in the Couplings tab.
11. Also, if defining a drawbar, enter the **Maximum articulation angle** which is the angle between the drawbar and the unit to which it is permanently attached.
12. If you are defining a nosewheel, bogie or drawbar axle group then you must specify the **Axle group pivot offset**. This is the distance in front of axle 1 on front axle groups and the distance behind axle 1 on rear axle groups.
13. On units with tired wheels the **Outer face wheel track** is measured over the outer faces of the outermost tyres on an axle. It is most important that this value is correct if you are specifying steering turn angle by kerb to kerb turning circle radius. Note that on **Pendel axles** this dimension is measured to the outer faces of each sub-axle.

On units with rail wheels the **Rail gauge** is measured between the faces of the wheels in contact with the inner faces of the rails.

14. Certain vehicles can have axles lifted from road contact when unloaded. Tick **Retracted** to specify an axle of this type. Note that you cannot define all axles in a group as retracted so by definition you cannot change this setting if the group only consists of one axle or if all axles are identical. The only

exception to this rule is the primary steered axles of a tractor used as a trailer which may be retracted.

15. **Bogies per row** and **Bogie spacing** apply only to **Pendel axles** and each tab represents a row of bogies. **Bogies per row** is the number of bogies in each row across the width of the unit. **Bogie spacing** is the distance between the pivot points of each bogie. You can specify irregular spacings by entering values as "1.5, 2.1, 1.5". In this case the first spacing is the distance between the outermost bogie and the adjacent bogie, the second value is the distance between the next two bogies and so on. The last value is assumed to apply to any remaining bogie spacings. The row of bogies is assumed to be symmetrical so you only need to specify spacings for the bogies on one side.
16. **Axles per bogie**, **Bogie axle spacing** and **Bogie pivot offset** apply to **Tandem bogies** which have multiple pivots along the centreline of the unit. Each tab represents a bogie. **Axles per bogie** is the number of axles in a single bogie. Bogie axles are all identical and **Bogie axle spacing** is the distance between any two. **Bogie pivot offset** is the distance from the natural centre of the bogie to the actual pivot position. This is zero by default.
17. If the axles are not equally spaced then tick **Offset from previous axle**, and enter a value in the field. Note that axle 1 has no offset.
18. On non-turning axle groups (e.g. fixed, undercarriage) you may tick **Self steered** to allow selected wheels to rotate freely about their vertical axis (much like the wheels of a shopping trolley) on the Ackerman principle. This will affect the AutoTrack calculation of effective axle offset on multi-axle groups. Select the directions in which the self-steering applies.

It is widely assumed that self-steered axles have no effect on the position of the effective axle but if you consider that they have some effect you may wish to specify the effect of the axle compared to a fixed axle with the same wheels by specifying a **Self steered friction factor**. A zero friction factor means the self-steered axle has no effect on the effective axle position. A value of 100% means the self-steered axle has the same effect as a fixed axle. In addition, the wheel angle will be adjusted by the same friction factor.

19. On axle groups that include Ackerman steered wheels you may tick **Fixed** to prevent selected wheels from turning. Select the directions in which the axle is fixed.

#### **Note**

*Currently axles fixed in this way are only drawn fixed and are still considered as turning for the purposes of calculating the effective axle position.*

20. **Total wheels per axle / subaxle** can be any positive value, odd or even. If you specify an odd value the odd wheel will be drawn at the centre irrespective of the wheel placement specified in the next field.
21. **Wheel placement** defines how the wheels are positioned along the axle. It can be set to **At Ends of Axle**, **Evenly Spaced** or **Specified Spacing**. If you select Specified Spacing you must provide the **Wheel spacing**, the distance between centres of the wheels. The default is twice the wheel width.

22. If you are defining an Ackerman axle with wheels located at the ends of the axles then you have the option to set a **Stub axle length**. The stub axle length is the distance from the centre of the wheel group to the pivot at the opposite end of the stub axle.
23. On units with tired wheels the **Tyre diameter** is measured to the tread surface for units with tyres. Note that this does not affect path prediction where all axles are identical but may affect the calculated effective axle offset when the track widths of each axle in a group varies and therefore affect the resultant path.

On units with rail wheels the **Wheel diameter** is measured to the surface in contact with the rail.

A default value is provided but if you know the actual value then overwrite the default.

24. On units with tired wheels the **Tyre width** is measured at the contact point. Note that this does not affect path prediction where all axles are identical but may affect the calculated effective axle offset when the track widths of each axle in a group varies and therefore affect the resultant path.

On units with rail wheels the **Wheel width** is measured to the outer faces of the wheel.

A default value is provided but if you know the actual value then overwrite the default.

25. Click the **New** button to add an axle after the last one currently defined, i.e. if you have 3 axles defined the new axle will be axle 4. The new axle will be initialised with the same values as the current axle.
26. Click the **Insert** button to insert an axle at the current location, i.e. if you are displaying axle two of three the inserted axle will be numbered 2. The inserted axle will be initialised with the same values as the current axle.
27. Click the **Remove** button to remove the currently displayed axle from the group. Note that you cannot remove axle 1, instead you must untick Front Axles or Rear Axles on the Unit tab to remove the axle group completely.

### Unit Details: Axle Groups: Secondary Steering Details (4090)

1. Secondary steering includes both linked steering and manually controlled secondary steering. Secondary steering may comprise a linkage with manual over-ride or just manual control of a second set of steered wheels.
2. Linkage rules can apply in both directions at all speeds or you can define rules that only apply in one or other direction from certain speeds and/or angles.

**Secondary Steering Details**

☒ The rear axles are linked to the front articulation angle as follows

Scope	Angle	Factor/EWB	Basis
Forwards and reverse	0.00	0.00	Tangents

New Insert Delete

☐ These linkage ratios are also speed dependent as follows

Scope	Speed	Factor
-------	-------	--------

New Insert Delete

☐ This linkage can be overridden at drive time

☐ Forwards ☐ Below speed of   
☐ Reverse ☐ Below speed of   
 Linkage ratio: Min  Max

☒ The rear wheel angle can be overridden at drive time

Maximum wheel angle   
 Lock to Lock Time

Close Help

Unit Details: Axle Groups: Secondary Steering dialog

3. Tick **The {position} axles are linked** to specify axles whose angle is controlled by a **linkage** to an articulation or wheel angle. The linkage ratio is then the ratio of the secondary wheel angle to the controlling wheel angle. If this option is unticked then the axles will be set as manually controlled and vice versa, i.e. secondary steering must be either a linkage axle or a manually controlled axle.
4. Select the **Scope** of the linkage from the drop down list. You may select Forwards Only, Reverse Only or Forwards & Reverse.
5. Enter the **Angle** from which the linkage applies. Note that the first entry in the table always has a starting angle of 0.0, which cannot be edited. If you have an angular linkage that starts from a greater angle click **New** to add a new linkage.

6. The **Basis** determines whether a factor is applied directly to the angles, i.e. the linked angle is directly proportional to the angle of the item to which it is linked; or to the tangents of the angles, i.e. the tangent of the linked angle is proportional to tangent of the angle of the item to which it is linked; or whether the linkage is defined as an effective wheelbase. Select **Angles**, **Tangents** or **EWB** as appropriate.
7. Linkages by **Angles** or **Tangents**:-  
Enter the linkage **Factor**, which is the amount by which the linked wheels turn expressed as a proportion of the angle of the item to which it is linked. Note that the factor can be applied to either the tangents of the angles or the angles themselves (see Basis below). The linkage factor is assumed to vary linearly to the next specified angle. The linkage factor does not increase beyond that assigned to the highest angle listed.

**Note**

*If you need the linkage factor to change in steps rather than linearly you should create two entries at each angle, the first with the factor set to the value for the previous angle and the second with the factor set to the new value.*

8. Linkages by effective wheelbase or **EWB**:-  
Enter the **EWB**, which is the distance from the effective steered axle to the effective fixed axle. The EWB is assumed to vary linearly to the next specified angle. The EWB does not increase beyond that assigned to the highest angle listed.

**Note**

*If you need the EWB to change in steps rather than linearly you should create two entries at each new angle, the first with the EWB set to the value for the previous angle and the second with the offset set to the new value.*

9. If there are speed dependent linkages tick **These linkages are also speed dependent**.
10. Select the **Scope** of the speed related linkage from the drop down list. You may select Forwards Only, Reverse Only or Forwards & Reverse.
11. Enter the **Speed** from which the linkage applies. Note that the first entry in the table always has a starting speed of 0.0, which cannot be edited. If you have a speed linkage that starts from a higher speed click **New** to add a new linkage.
12. Enter the speed linkage **Factor**, which is the amount by which the linked wheels turn expressed as a proportion of the angle of the item to which it is linked. The linkage factor is assumed to vary linearly to the next specified speed. The linkage factor does not increase beyond that assigned to the highest speed listed. If you have a speed linkage that starts from a greater speed click **New** to add a new speed linkage.

**Note**

*If you need the linkage factor to change in steps rather than linearly you should create two entries at each new speed, the first with the factor set to the value for the previous speed and the second with the factor set to the new value.*

13. If the linkage ratio can be controlled by the driver then tick **This linkage can be overridden at drive time**. Tick **Forwards** if the linkage ratio can be adjusted while travelling forwards and **Reverse**

if it can be adjusted while reversing. If there is a limiting speed in either direction tick **Below speed of** and enter the limiting speed.

14. Finally, enter the range within which the linkage ratio can vary. Note that this is always expressed as the ratio between the limiting angles of the linked wheels and the angles of the item to which they are linked (typically the articulation angle), so the minimum ratio will give the greatest off-tracking and the maximum ratio the smallest off-tracking.
15. Tick **The {position} axles can be manually controlled** to specify wheels whose **angle** can be set independently of the primary steered axles. If this option is unticked then the axles will be set as linked and vice versa, i.e. secondary steering must be either a linkage axle or a manually controlled axle.

**Note**

*The angles of linked axles may also be manually controlled but only if the linkage ratio cannot also be over-ridden.*

16. The **Maximum secondary steering angle** is the maximum angle of any wheel in the secondary steered axle group.
17. By default the **Secondary lock to lock time** is zero meaning that there is no delay in the application of changes in the secondary steering angle. However, we recommend that a value is entered if known.

## Unit Details: Steering <sup>(4150)</sup>

1. Click on the **Steering** tab.

The screenshot shows the 'Unit Details' dialog box with the 'Steering' tab selected. The title bar indicates dimensions in m, deg, sec, km/h. The 'Steering Details' section includes a 'Primary steering' dropdown set to 'Front Axle', 'Lock to lock time forwards' and 'Lock to lock time reverse' both set to 6, and 'Maximum steering angle' set to 0 with a checked option to 'Use calculated value of 35.4'. Below this, the 'Basis for calculation of maximum steering angle' section has three radio buttons: 'Kerb to kerb radius' (selected) with a value of 6.87, 'Wall to wall radius' with a value of 0, and 'Maximum wheel Angle' with a value of 0. The 'Kerb to kerb radius' option is further configured with 'All Axles' selected in a dropdown, 'at 0 (speed)'. The 'Driver / Pilot' section includes 'Longitudinal offset' (0.11 behind datum), 'Lateral offset' (0.6 from centreline), and 'Height' (1 above ground). A checkbox 'Move driver / pilot to the Left when the convention is to drive on the Right' is checked. At the bottom are 'Print', 'OK', 'Cancel', and 'Help' buttons.

Unit Details dialog: Steering tab

2. The **Primary steering** is determined by the design of rest of the unit. AutoTrack assumes that the primary steering is applied at the steerable axle or coupling that is not linked to any other. If there are no such axles or couplings (or more then one) you will be warned. Thus if the unit has steering on both front and rear wheels then one of the axles must be specified as linked.
3. The lock to lock time is the time taken to turn the primary steering from full left lock to full right lock (or vice versa). You may specify a different value for **Lock to lock time forwards** and **Lock to lock time reverse**. Note that this value can be over-ridden by disabling the steering rate limits in the Model.

### Tip

*Lock to lock time is a term that Savoy Computing introduced way back in the eighties. Whilst it is a useful way to describe the steering characteristics of a vehicle it is nevertheless a parameter that is little used in the motoring industry. Far more common is the number of turns of the steering wheel lock to lock. Clearly the two parameters are closely related and it may be useful when defining new vehicles to think in terms of number of turns lock to lock. Of course the time it takes to complete one turn of the wheel may vary between vehicles according to steering wheel size, resistance to turning and other factors.*

4. The **Maximum steering angle** is the angle of an imaginary wheel at the centre of the steering (axle or coupling). If you do not have this information to hand AutoTrack is able to calculate it for you in one of three ways. Tick **Use calculated value** if you want AutoTrack to calculate the maximum steering angle.
5. If you know the relevant radius then we recommend that you select either **Kerb to kerb radius** or **Wall to wall radius** as the basis for the maximum steering angle calculation.



If you selected **Kerb to kerb radius** you should now specify whether the radius is based upon **All Axles** or just **Active Axles**. The latter ignores retracted axles.

If you selected **Wall to wall radius** then you should specify whether the radius is based upon **Body Only** or **Body and Loads**. Usually a wall to wall radius is measured to the outer limits of the vehicle body excluding any loads being carried. If this is the case select **Body Only**.

Finally, if you have speed related linkages defined then you will also need to specify the speed at which the radius applies. If you do not have any speed related linkages defined then leave the speed at zero.

6. If you do not know either the kerb to kerb or wall to wall radius then you should use the **Maximum wheel angle** or **Maximum artic angle**. The Maximum Wheel Angle is the maximum angle of any wheel on the primary axle group (front or rear). The Maximum Artic. Angle is the maximum coupling articulation in the case of vehicles with steerable couplings. The value is taken from the **Wheel angle limited to** box on the appropriate axle group tab or from the **Maximum horizontal angle** box on the coupling tab.

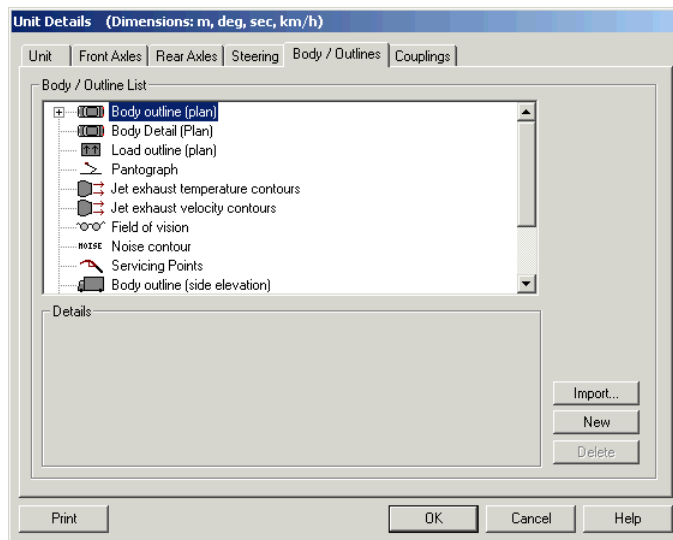
#### **Warning**

*The **Maximum wheel angle** represents the maximum angle of any wheel in the axle group, unlike previous versions of AutoTrack in which it referred to an imaginary centre line wheel. The imaginary centre line wheel angle is now referred to as Maximum Steering Angle.*

7. The **Longitudinal offset** is the distance of the driver (specifically his eye) in front of axle 1.
8. The **Lateral offset** is the distance of the driver's eye from the centreline of the vehicle looking towards the front of the vehicle. You may specify a negative lateral offset if the driving convention requires it. Refer to [Drawing Settings: Scale](#).
9. The **Vertical offset** is the height of the driver's eye above ground level and is used in driver's eye viewpoint animations.
10. The position of the driver on the left or right is defined for the driving convention currently set. If you want the driver to be relocated for the opposite driving convention then tick **Move the driver/pilot to the ... when the convention is to drive on the ...**

## Unit Details: Body / Outlines (4120)

1. Click on the **Body / Outlines** tab.



Unit Details dialog: Body/ Outlines tab

2. Outlines are categorised into different types, body, load etc. This allows you to switch the different types of outline on or off later when analysing the swept path. Furthermore, within each type of outline you can define different groups of shapes. So, for example, you might define a low loader trailer with two shapes in the Load Outline group, one representing an excavator (called Excavator) and another representing a dumper truck (called Dumper). Like the outline groups these can be independently switched on and off later.
3. To add a new outline, highlight the type, e.g. Body outline, Load outline etc, or group, and click the **New** button. A blank shape will be added either in a new default group or in the group you selected.
4. The top window contains an expanding tree view of the defined outline types. Each may contain zero or more groups of shapes. Two groups, **Body outlines** and **Load outlines** are special types that are referenced elsewhere in the unit details. Body outlines typically contains at least one group of shapes that defines the shape of the body of the unit. The Load outline may contain a shape group that represents a load.
5. The lower frame lists the details of the currently selected entry in the tree view. As you move the cursor over different objects in the tree the details change.
6. To add a new body outline highlight the Body outline type and click the **New** button. A new shape group containing a single shape will appear. Select the required shape **Type** from the drop down list box (Rectangle, Circle, Arc, Arc Segment, Line, Tram body, Tractor body, Aircraft body, Jet Exhaust Contour, Wing Mirror or Text) and enter the requested values.

To enter data for **Line** shapes click the **Vertices** button. The Vertices dialog will appear. See below.

To enter data for **Tram body** shapes click the **Tram Body**

button. The Tram dialog will appear. See below.

To enter data for **Tractor body** shapes click the **Tractor Body** button. The Tractor dialog will appear. See below.

To enter data for **Aircraft body** shapes click the **Aircraft Body** button. The Aircraft dialog will appear. See below.

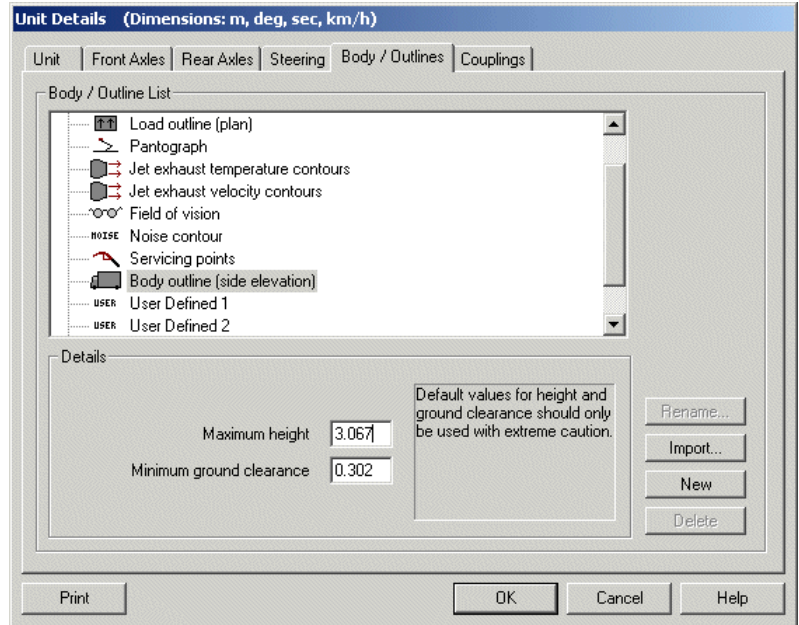
To enter data for **Jet Blast contour** shapes click the **Jet Blast Contour** button. The Jet Blast Contour dialog will appear. See below.

7. Enter the **X Offset** and **Y Offset** to position the shape as required. Note that certain shapes have a **Mirror about the X-axis** check box. Use this to copy an asymmetrically placed shape about the X-axis.
8. You can if you wish import shape outlines from your drawing rather than defining them from scratch. Highlight the outline type that you wish to add and click the **Import** button. The Import dialog will appear. See below.
9. To remove a single shape or group of shapes highlight it in the tree view and then click the **Remove** button. You cannot remove outline types (i.e. Body outline etc) from the tree view.
10. New shape groups or shapes are given default names. To change the name of a shape or shape group simply highlight it and then click once.
11. Load outline shapes represent objects that are not part of the base vehicle. The good example is an excavator being carried on a low loader. Shapes of this type may optionally be excluded from calculations of steering angle that are based upon wall to wall turning circle.
12. Groups of shapes may be offset from the unit datum and individual shapes may be offset from the shape group datum. This allows you to move a group of shapes without having to move each individual shape.

## Height and ground clearance

If you intend to perform a vertical clearance path analysis for the vehicle then you will need to either enter a custom side elevation or set the overall height and ground clearance to use the default vehicle type elevation adjusted for these values. You may enter a side elevation just like any other outline (see above). To use the default outline...

1. Highlight Body outline (side elevation).



Unit Details dialog: Body / Outlines tab

2. Enter the **Maximum height** and **Minimum ground clearance** in the Details section at the bottom.
3. Click **OK** to confirm. The side-elevation will 'stretch' such that the highest and lowest points correspond to the values you provide.

### Warning

*If you do not enter these values defaults will be used. It is unlikely that the default values will be precisely correct so to obtain useful results you **MUST** enter these values unless you define a custom side elevation.*

### 3D body shapes for animation

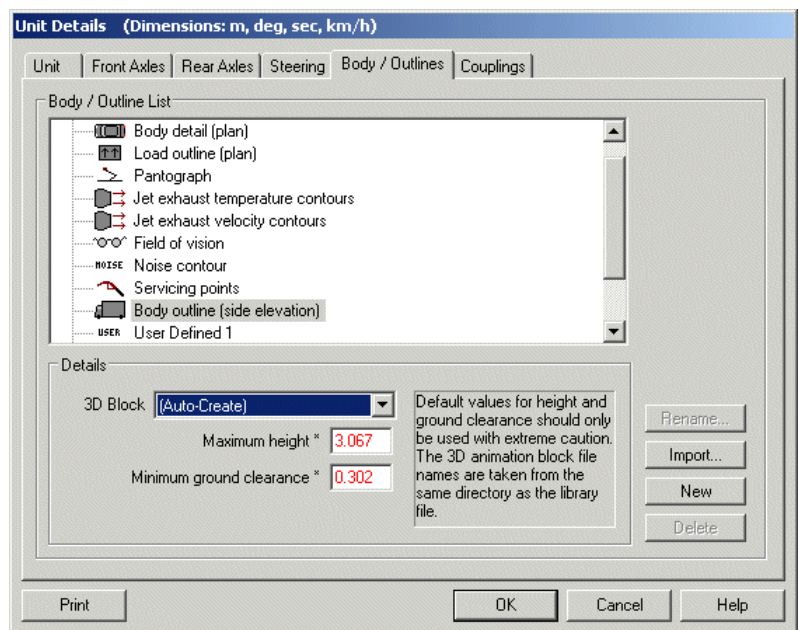
If you are running a system capable of 3D animation, you will need a 3D body shape for your vehicle. By default AutoTrack automatically creates a 3D body shape from the information supplied but you can define a more detailed shape if you wish.

The 3D body should be defined in AutoCAD as a block with the origin at the centre of the front coupling (or the centre of the rearmost front axle if there is no front coupling). The shape should be oriented with the spine of the vehicle running along the x-axis (increasing towards the back of the vehicle), the width on the y-axis and the height on the z-axis (increasing with height).

If the block has units defined then AutoTrack will adjust the block to comply with the drawing units set in AutoTrack. If not then AutoTrack assumes that the block is drawn in millimetres.

To use the new shape...

1. Ensure that the AutoCAD drawing containing the block is placed in the `Library\Blocks` directory.
2. Highlight Body outline (side elevation).



Unit Details dialog: Body / Outlines tab

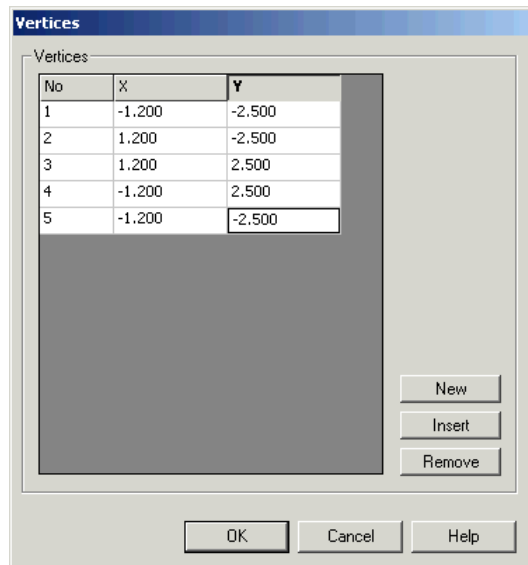
3. Select the drawing from the drop down list.
4. Click **OK** to confirm.

#### Note

*Only the name of the 3D block is stored in the drawing. This means that if you send a vehicle to a third party, either in the form of a library or as a drawing, you will need to send them the custom block as well. If AutoTrack cannot find a named block it will use the **Auto-Create** option.*

### ***Editing vertices (Vertices dialog) <sup>(4180)</sup>***

1. The vertices are listed in order. You cannot edit the vertex number.

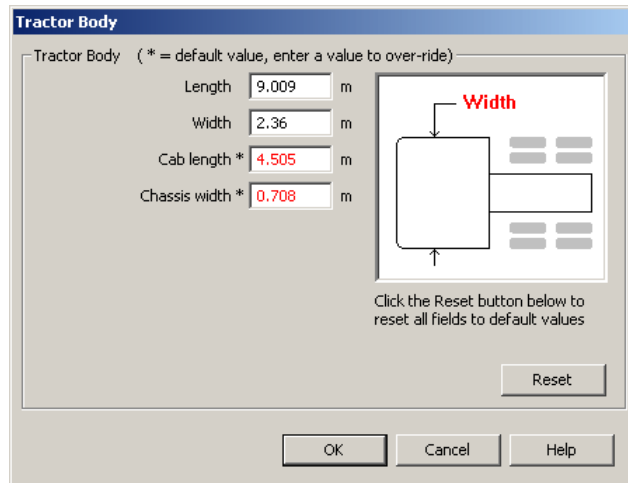


Vertices dialog

2. Click **New** to add a new vertex at the end of the list.
3. Click **Insert** to insert a new vertex at the current position.
4. Click **Remove** to remove a vertex from the list.

## ***Editing Tractor bodies (Tractor body dialog)*** <sup>(4220)</sup>

1. The Tractor body shape is defined with four dimensions.

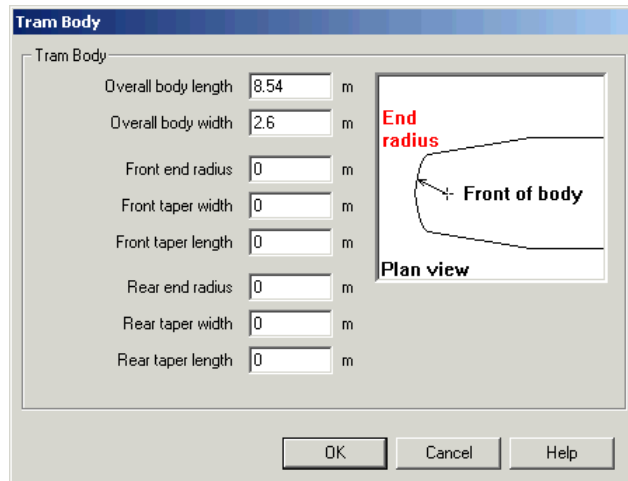


Tractor Body dialog

2. The **Length** and **Width** define the overall length and width respectively of the body.
3. The **Cab length** is the length of the cab itself and defaults to half the overall body length.
4. The **Chassis width** is the width of the chassis behind the cab and defaults to one third of the overall body width.
5. The **Front radius** is the radius of the front of the body.
6. The **Wing radius** is the radius of the two front corners of the body.

## Editing Tram bodies (Tram Body dialog) <sup>(4200)</sup>

1. The Tram Body shape is defined with eight dimensions.



Tram Body dialog

2. The **Overall body length** and **Overall body width** define the basic rectangular body.
3. The **Front taper width** is amount by which the front of the tram body narrows *on each side* at the end. For example, if the uniform body width is 2m and the end width is 1m then the taper width is 0.5m. Likewise **Rear taper width**.
4. The **Front taper length** is the distance from the start of the body width reduction to the end of the tram body. Likewise, **Rear taper length**.
5. The **Front end radius** defines a curve of the front of the body. If the front end radius is less than half the end width (defined as the overall body width minus twice the front taper width) a semi-circle will be added. If you specify a negative front end radius the front of the tram will be concave (i.e. curved inwards instead of outwards). This is used on the trams we provide to represent the inter-car turntable at articulation points. Likewise, **Rear end radius**.



## Editing Aircraft bodies (Aircraft Body dialog) <sup>(4210)</sup>

1. The Aircraft Body shape is defined with 16 dimensions. Many of these default to a reasonable value if the field is zero. Default values are shown in red with an asterisk beside the field. Obviously, some dimensions will be more critical than others but you are strongly advised to replace all of the default values with accurate data.

Aircraft Body [ \* = default value, enter a value to over-ride]

Field	Value	Unit
Fuselage length	8.54	m
Wing span	2.6	m
Wing tip leading edge offset *	5.2948	m
Wing root leading edge offset *	3.0744	m
Wing tip taper	0	m
Wing tip width *	0.427	m
Wing root width *	1.4518	m
Tail span *	0.832	m
Tail tip leading edge offset *	8.2838	m
Tail root leading edge offset *	7.6006	m
Tail tip taper	0	m
Tail tip width *	0.3416	m
Tail root width *	0.5978	m
Fuselage width *	0.26	m
Fuselage front taper length *	1.281	m
Fuselage rear taper length *	2.3485	m

Click the Reset button below to reset all fields to default values

Reset

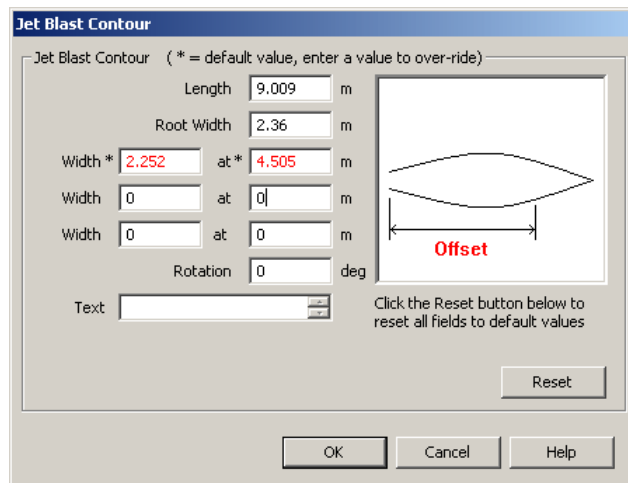
OK Cancel Help

Aircraft Body dialog

2. The **Fuselage length** and **Wing span** must be provided. As soon as these values are entered a default outline will appear.
3. The **Wing tip leading edge offset** is a critical value since it locates the point that is often critical in determining the swept envelope.
4. Enter as many values as you can.

## Editing Jet Blast contours (Jet Blast Contour dialog) <sup>(4230)</sup>

1. The jet blast contour shape is defined with up to 9 dimensions.

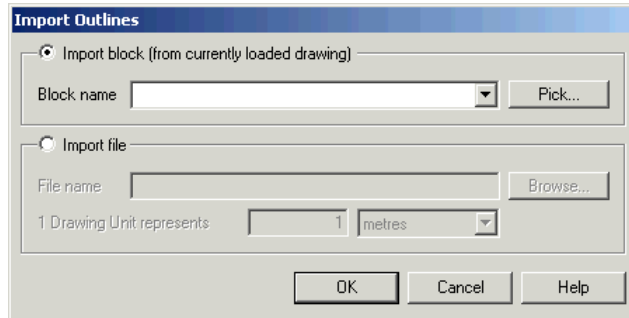


Jet Blast Contour dialog

2. The **Length** is the length of the contour from root to tip.
3. The **Root Width** is the width of the contour at the end closest to the engine.
4. At least one pair of **Width at** fields must be provided. Default values are provided for these. Up to two further pairs may optionally be added to adjust the shape of the curve.
5. The **Rotation** is the angle of the contour from the X-axis.
6. Optionally text may be assigned to the contour.

### **Importing outlines (Import Outlines dialog) (not MicroStation version) <sup>(4190)</sup>**

1. You may either import a shape as a text file or as a graphic entity from the current drawing.



Import Outline dialog

2. Select **Import block** to import a graphic from the current drawing and then either select the block name from the drop down list or use the **Pick** button to select a polyline using the mouse.
3. If you use this feature you will need to ensure that the shape is correctly aligned with respect to the axis system and reference datum of the parent unit. Thus, assuming zero offset, your shape should be oriented facing to the left with the origin at the reference datum (usually the primary front axle or front coupling).
4. If you use this feature to define side elevations note that the reference datum is assumed to be the road surface. Thus, again assuming zero offset, your shape should be defined with the lower edge at the height of the required ground clearance.
5. Select **Import file** to import an AutoCAD drawing file (see next section), or an ASCII text file (comma or space delimited) and click the **Browse** button. When the Open File dialog appears, select the appropriate file type and browse to find your file. Click **Open** to get the data into the table.

#### **Note**

*A delimited format should be simply a list of coordinate pairs either comma (CSV) or space delimited (TXT), e.g.:-*

**x1 , y1**

**x2 , y2**

etc...

## Importing AutoCAD drawing files

### Note

*This feature is not available in the MicroStation version.*

1. The facility to import outline data from drawing file allows you to import data for both plan view and side elevation (and any other outline types) in one operation. However, to ensure that the right elements go in the right outlines you must follow a layering convention.
2. The layer naming convention is as follows:-

**{Outline Type}{Shape Group}**

where **{Outline Type}** is one of the following:-

BODYOUTLINEPLAN  
BODYDETAILPLAN  
LOADOUTLINEPLAN  
PANTOGRAPH  
JETEXHAUSTTEMPERATURE (or JETTEMP)  
JETEXHAUSTVELOCITY (or JETVEL)  
FIELDOFVISION  
NOISE  
SERVICING  
BODYOUTLINESIDE  
USERDEFINED1  
USERDEFINED2  
USERDEFINED3

and **{Shape Group}** is entirely at your discretion.

3. AutoTrack strips off any outline type prefixes that it recognises from the list above and uses the remainder as the name of the shape group. If there is no text remaining after the prefix has been removed AutoTrack supplies a default name for the shape group.

### Example 1

All entities on layer BODYOUTLINESIDEWINGMIRRORS in the imported drawing will be placed in the outline type **Body outline (side)** in a shape group called **WingMirrors**.

### Example 2

All entities on layer BODYOUTLINEPLAN in the imported drawing will be placed in the outline type **Body outline (plan)** in a default shape group called **Body**.

4. Draw a circle on layer UxORIGINPLAN and UxORIGINSIDE to specify an offset unit origin in plan and side views respectively where x represents the unit number. Thus the centre of a circle drawn on layer U1ORIGINSIDE is assumed to be the origin of the side view of unit 1.

## Unit Details: Couplings <sup>(4140)</sup>

1. Click on the **Couplings** tab.

Unit Details (Dimensions: m, deg, sec, km/h)

Unit | Rear Axles | Body / Outlines | **Couplings**

☒ **Front Coupling**

Front coupling type: Generic

Capability: Can Tow or be Towed

Coupling offset: 0 In front of datum Height: 0.373

Maximum horizontal angle: 90 Maximum vertical angle: 10

☒ Assume coupling height matches rear coupling on previous unit

☒ **Rear Coupling**

Rear coupling type: Generic

Capability: Can Tow or be Towed

Coupling offset: 3.814 Behind datum Height: 0.373

Maximum horizontal angle: 90 Maximum vertical angle: 10

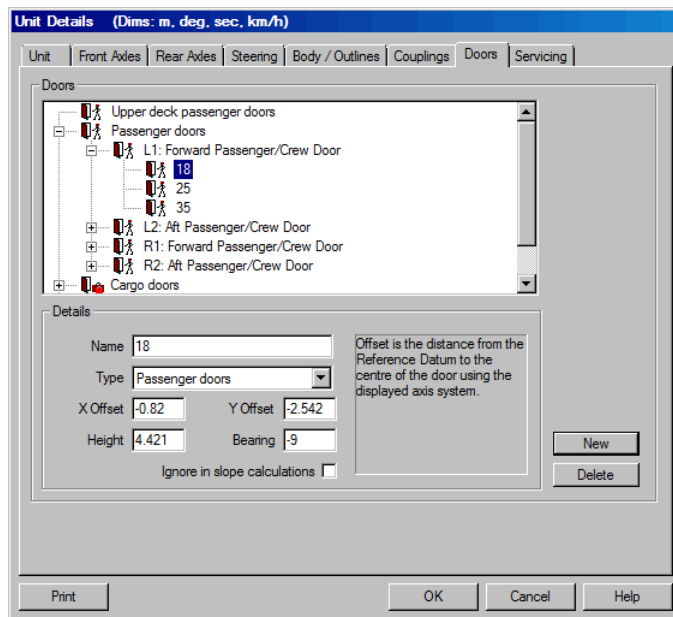
Print OK Cancel Help

Unit Details dialog: Couplings

2. Tick **Front Coupling** and / or **Rear Coupling** to include front and rear couplings respectively.
3. The **Type** of coupling dictates what other units can be connected to this unit, i.e. the coupling types must match. The exception is that any coupling type can be linked to a generic coupling. Coupling type Active Steerable Coupling allows users to model vehicles with no conventional steered wheels but instead a articulation point whose angle is controlled by the driver, e.g. by hydraulic rams. A unit may only have one coupling of this type and it is always the primary steering.
4. The **Capability** of the coupling specifies whether it can tow other units, be towed or both.
5. The position of the coupling is defined by the **Coupling offset** which is measured relative to the datum point.
6. The **Coupling height** is used for vertical clearance analysis and defaults to a proportion of the wheel diameter. Enter an accurate figure if you have one.
7. The **Maximum horizontal angle** is the maximum possible articulation angle between the two connected units in the horizontal plane. Note that when this unit is coupled to another the articulation angle specified in the vehicle details form takes precedence if it is lower. Thus, a vehicle uses the lower of the articulation angle defined in the vehicle details and these values.
8. The **Maximum vertical angle** is the maximum possible articulation angle between the two connected units in the vertical plane and is used for vertical clearance analysis.
9. Tick **Assume coupling height matches rear coupling on previous unit** if the front coupling is able to adjust to suit the height of the coupling on the towing unit.

## Units Details: Doors (Aircraft only) <sup>(4125)</sup>

1. Click on the **Doors** tab.



Unit Details dialog: Doors

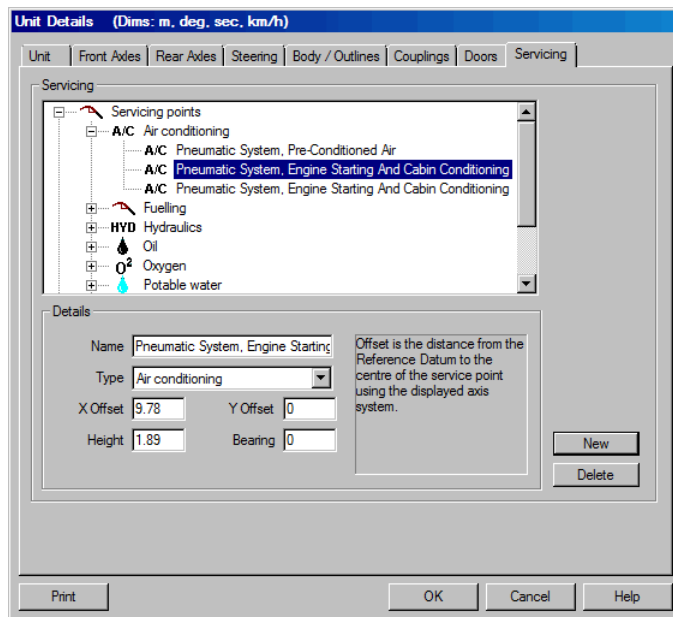
2. The doors are grouped into Upper Deck Passenger doors, Passenger doors, Cargo doors and Service doors.
3. To add a door move the cursor over the type you wish to add and click **New**.
4. Enter a **Name** for the door. The convention for passenger doors is to number them from front to back and prefixed with an 'L' for port (left) doors and an 'R' for starboard (right) doors. So port doors would be numbered L1, L2.....Ln.
5. Enter the **X Offset** & **Y Offset** of the door relative to the Reference Datum. X ordinates increase towards the back of the aircraft and the Y ordinates are positive to the right of the centreline and negative to the left.
6. Enter a **Bearing** for the door in degrees relative to the spine of the aircraft. Zero is due East.
7. To delete a door, highlight it and click **Delete**.
8. If you add a door to the wrong type, simply select the correct **Type** from the drop down list and the door will move.

### Multiple heights

1. To add a copy of a door at a different height, highlight the door and click **New**.
2. Enter the **Height** of the door. All the other details will be copied automatically from the parent.
3. Finally, to omit selected door heights from boarding bridge slope calculations simply tick **Ignore in slope calculations**.
4. To delete a door height, highlight it and click **Delete**.

## Unit Details: Servicing (Aircraft only) <sup>(4125)</sup>

1. Click on the **Servicing** tab.



Unit Details: Servicing

2. The servicing is divided into Servicing Points and Servicing Vehicles and then further into each type of service .
3. To add a service point or vehicle highlight the type you wish to add and click **New**.
4. Enter a **Name** for the service point or vehicle.
5. Enter the **X Offset & Y Offset** of the service point or the front axle of the service vehicle relative to the Reference Datum. X ordinates increase towards the back of the aircraft and the Y ordinates are positive to the right of the centreline and negative to the left.
6. Enter a **Bearing** for the service point or vehicle in degrees relative to the spine of the aircraft. Zero is due East.
7. To delete a service point or vehicle, highlight it and click **Delete**.
8. If you add a service point or vehicle to the wrong type, simply select the correct **Type** from the drop down list and the service will move. It is not possible to move an entry from service points to vehicles or vice versa.

### Multiple heights

9. To add a copy of a service point at a different height, highlight the service point and click **New**.
10. Enter the **Height** of the service point. All the other details will be copied automatically from the parent.
11. To delete a service point height, highlight it and click **Delete**.













# Parking: Creating and editing parking areas

AutoTrack defines a parking area as a collection of parking rows each of which consists of individual bays. Each row is created in accordance with a standard. In most cases rows within a parking area use the same basic standard.

---

## Placing rows of bays

A row of bays is considered to be a single or double sided row of bays with any number of bends. All the bays on each side of a double row must have the same properties but they may differ from those of the other side. Rows may be placed freehand or parallel to other rows or objects.



*Place Row of Bays  
button*

### To place a row of bays freehand

1. Select **Place Row of Bays** from the AutoTrack, Parking Layout menu or click the **Place Row of Bays** button on the Parking Layout toolbar.
2. If this is the first row placed in the current drawing, and you do not have a default standard set, the Parking Standard Explorer will appear for you to select the required standard (see [Viewing a standard in a parking standard file or the pool \(Parking Standard Explorer dialog\) \(4400\)](#)). If you do not have a default standard set you may then be offered the chance to set it as your default (see [Default Parking Standard dialog \(4690\)](#)). Finally, you will be asked to give the standard a unique name for easy reference in the current drawing (see [Unique parking standard names](#)).
3. The Row Properties dialog will appear non-modally, i.e. you can still access the main CAD window without closing the dialog first.
4. Set the row properties. Refer to [Editing rows \(Parking Row Properties dialog\)](#) for more details of this process.
5. Move the cursor to where you want the row baseline to start and left click to confirm.

#### **Note**

*You may use snap to help you locate the precise start position.*

6. Move the cursor to end of the row and left click to confirm.
7. Repeat this process, placing a point at each vertex or bend on the row.

8. When you have placed the last point right click to exit.
9. Finally you should select which side you want bays, either left, right or both. The red arrow that is displayed halfway along each row segment shows the current setting. Move the cursor to the left of the row to select bays only on the left, to the right to select bays only on the right or over the row baseline to select bays on both sides.

#### Note

*To disable the row side selection while the Parking Row Properties dialog is displayed untick **Skip row side selection** before placing the row.*

## To place a parallel row of bays



*Place Parallel Row of Bays button*

1. You can place rows of bays parallel to existing rows using the Place Parallel Row tool. Rows placed in this way are automatically extended or shortened according to the angles of the end islands, which themselves reflect the angle of the access road.
2. Select **Place Parallel Row of Bays** from the AutoTrack, Parking Layout menu or click the **Place Parallel Row of Bays** button on the Parking Layout toolbar. The Parking Row Properties dialog will appear non-modally, i.e. in such a way that you can still access the CAD window without closing the dialog first.
3. If this is the first row placed in the current drawing, and you do not have a default standard set, the Parking Standard Explorer will appear for you to select the required standard (see [Viewing a standard in a parking standard file or the pool \(Parking Standard Explorer dialog\)](#)<sup>(4400)</sup>). If you do not have a default standard set you may then be offered the chance to set it as your default (see [Default Parking Standard dialog](#)<sup>(4690)</sup>). Finally, you will be asked to give the standard a unique name for easy reference in the current drawing (see [Unique parking standard names \(Parking Standard Name dialog\)](#)).
4. Set the properties of the parallel row. Refer to [Editing rows \(Parking Row Properties dialog\)](#) for more details of this process.
5. Select the row or line to which the new row will be parallel. The new row will appear and move as you move the cursor.
6. The dashed line from the end of the existing row to the cursor represents the distance of the baseline of the new row from the baseline of the existing row. Move the cursor until the row is positioned as you want it and then left click to confirm.

#### Note

*The row cannot be placed closer to the existing row or line than the minimum clearance zone allowed by the standard.*

7. Finally you should select which side you want bays, either left, right or both. The red arrow that is displayed halfway along each row segment shows the current setting. Move the cursor to the left of the row to select bays only on the left, to the right to select bays only on the right or over the row

baseline to select bays on both sides.

#### Note

To disable the graphical row side selection tick **Skip row side selection** on the Parking Row Properties dialog before placing the row.

Tick **Always skip row side selection** if you want this feature disabled until further notice.

## Unique parking standard names (Parking Standard Name dialog)

In order to make it easier to identify standards, and the parking bays that use them, we recommend that each standard used has a unique name. Therefore, when you place a new row (either freehand or parallel), that uses a standard not previously used within the current drawing, the Parking Standard Name dialog will appear offering a unique name of the form "Area n based upon {Parking Standard}". You may edit this name but it must be unique. If you cancel the Parking Standard Name dialog the default name that was initially offered will be used.

To subsequently change the name of a standard, open the **Parking Standard Explorer**, select the required standard, right click and select **Edit**. Now you can change the name. See also [To edit a parking standard](#).

---

## Placing access roads (4430)

Access roads can be placed cutting through existing parking rows. These roads may be at any angle and may cut through as many parking rows as you wish.

### To place an access road freehand



Place Access Road button

1. Select **Place access road** from the AutoTrack, Parking Layout menu, click on the **Place access road** button on the AutoTrack Parking Layout toolbar or type `ATRAPLACEACCESSROAD` on the command line.
2. The access road is defined by the left kerb, the right kerb or the centreline. Use the mouse to pick the start of the access road followed by the end. Note that the points you pick are only used for alignment purposes and their locations are otherwise unimportant. The Access Road Properties dialog will appear.

Access Road Properties dialog

3. The width of the road may either be determined from a

standard or entered explicitly.

4. Select the **Standard**, **Service type** and **Flow type** and the **Width from standard** will be displayed. If you want to override this value tick **Custom width** and enter the required width.
5. Set the **Line alignment** according to the alignment points you picked.
6. Click **OK** to confirm. AutoTrack will place the access road trimming any parking rows that your alignment crosses and calculating new end islands where necessary.

## To place an access road on a line



*Place Access Road on Line button*

1. Select **Place access road on line** from the AutoTrack, Parking Layout menu, click on the **Place access road on line** button on the AutoTrack Parking Layout toolbar or type `ATRCREATEACCESSROADFROMLINE` on the command line.
2. Select a line representing the alignment of the left kerb, the right kerb or the centreline. The Access Road Properties dialog will appear.

Access Road Properties dialog

3. The width of the road may either be determined from a standard or entered explicitly.
4. Select the **Standard**, **Service type** and **Flow type** and the **Width from standard** will be displayed. If you want to override this value tick **Custom width** and enter the required width.
5. Set the **Line alignment** according to the alignment points you picked. Note that the access road will be drawn from start to finish of the line that you picked so if this line represents a kerb you should make sure you know which end is the start. If you get it wrong then use Undo and rerun the command specifying the opposite kerb.
6. Click **OK** to confirm. AutoTrack will place the access road trimming any parking rows that your alignment crosses and calculating new end islands where necessary.

---

## Parking Report <sup>(4410)</sup>

The Parking Report is a dynamically updated bay count by any or all of the following:- parking standard, bay style, service type, vehicle class and / or parking zone.





*Parking Report button*

## To display the parking report

1. Select **Parking Report** from the AutoTrack, Parking Layout menu, click the **Parking Report** button on the AutoTrack Parking Layout toolbar or type `ATRAPARKINGREPORT` on the command line. The Parking Report dialog will appear.

Standard	Stall Type	Service ...	Vehicle ...	Zone	Count	%
DB32	Normal	Standard	Standard	(Unnam...	58	100.00%
Total Stalls					58	100.00%

Buttons: Print, Customise..., Export, Close, Help

Parking Report dialog

2. Click **Close** when you no longer need it.

## To customise the parking report

1. Click the **Customise** button on the Parking Report dialog. The Customise Parking Report dialog will appear.

**Customise Parking Report**

☐ Show all columns

☒ Show selected columns

☐ Show parking standard

☒ Show parking bay type

☒ Show service type

☒ Show vehicle class

☐ Show parking zone

☒ Show bay count

☒ Show bay type percentages

Buttons: OK, Cancel, Help

Customise Parking Report dialog

2. Either select **Show all columns** or select **Show selected columns** and then the specific criteria you wish to report by. The Parking Report will change when you click **OK**.

## To export a parking report

1. Click the **Export** button on the Parking Report dialog. A Save As dialog will appear.
2. Select the type of delimited file you wish to save from the **Save as type** drop down list.
3. Browse to the directory in which you wish to save the file.
4. Name the file without the extension and click **Save**.
5. The saved file may be read into Excel or any other program that supports comma or tab delimited files.

---

## Editing rows (Parking Row Properties dialog) <sup>(4450)</sup>

Parking rows may comprise back to back bays or a single row of bays accessible from one or both sides. Back to back bays may differ in size, style and angle. Twin rows and single rows with single access may optionally have a kerb side access footpath. Dual access single rows of bays cannot have a footpath. If you need to have varying bay styles within a row then you should set the row style to the predominant style on each side and use the bay editing tool to change the style of those that differ.

### To edit a parking row



*Edit Parking Row button*

1. Select **Edit Parking Row** from the AutoTrack, Parking Layout menu or click the **Edit Parking Row** button on the AutoTrack Parking Layout toolbar. The Parking Row Properties dialog will appear.

**Parking Row Properties**

Standard    Design Bulletin 32 Second

Bay alignment

Bay end detail

Bay details

☐ Left only    Start No.

Flow direction: Two Way

Service type: Standard

Vehicle class: Standard

Bay angle: 90.00deg

Bay style: Normal

Zone name: (Unnamed)

☒ Both    ☐ Lock angles

Flow direction: Two Way

Service type: Standard

Vehicle class: Standard

Bay angle: 90.00deg

Bay style: Normal

Zone name: (Unnamed)

☐ Right only    Start No.

Islands & Footpaths

☐ Footpath    Width

☒ Start island    ☒ Has footpath

☒ Bend islands    ☒ Have footpaths

☒ End Island    ☒ Has footpath

☐ Skip row side selection

☐ Always skip row side selection

Close    Help

Parking Row Properties dialog

2. The bay alignment and end detail settings define the type of parking and in some cases restrict the bays to single or double row. If a double row is selected each side may have different properties.
3. The vehicle **Flow direction** in conjunction with the **Bay angle** determines how close the row can be placed to other rows or obstacles.
4. The **Vehicle class** and **Vehicle type** determine the basic size of the bay. However, the basic dimensions are often modified by the **Bay style**, so for example a disabled bay is generally wider than a standard bay.
5. The **Zone name** merely provides a means to divide a parking area into areas or zones. The Parking report can be set to report by zone name.
6. If you want the same bay angles on each side of a double row tick **Lock angles**.
7. Set the **Start No.** for each side to force a bay numbering sequence.
8. Each row may have islands and / or footpaths. Tick **Footpath** and enter a **Width** to specify a footpath running along the baseline, i.e. between the two sides on a double row or 'behind' a single row.

9. Tick **Start island** or **End island** to add islands at the start or end of the row. If you want a footpath to continue through the island tick **Has footpath**.
10. Tick **Bend islands** to add islands at every bend in the row. If you want a footpath to continue over the bend islands tick **Have footpaths**.

## Editing individual bays (Parking Bay Properties dialog) (4440)

Individual parking bays within a row may vary from the default bay type for the row. However, every bay must be of a defined type for reporting purposes. Thus, for example, if you wanted one bay within a row to have a wheel stop you would first have to define that bay type and then set the bay to that type.

### To edit a parking bay



*Edit Parking Bay button*

1. Select **Edit Parking Bay** from the AutoTrack, Parking Layout menu or click the **Edit Parking Bay** button on the AutoTrack Parking Layout toolbar. Select the row you want to edit. Grips will appear in each bay and the Parking Bay Properties dialog will appear.

Parking Bay Properties dialog

2. As you move the cursor over each bay the properties dialog updates to show the bay type. The other fields merely show what features comprise the selected bay type. All values will be displayed as read-only, i.e. non-editable.
3. As soon as you select a bay the **Bay type** drop down list box should become active, i.e. editable. If you select a different bay type the other fields will change to reflect the settings for the new type. The underlying bay type defined for the row is shown as (Default).

#### Note

*If you want to change the bay type for most or all of a row then you should consider editing the row properties.*

## Editing islands (Parking Island Properties dialog) <sup>(4460)</sup>

Parking islands are placed at the ends of each row of bays and at each change of direction of the row. End islands and bend islands may have different default properties and thereafter any island may be edited such that it becomes unique.

### To edit a parking island



*Edit Parking Island button*

1. Select **Edit Parking Island** from the AutoTrack, Parking Tools menu or click the **Edit Parking Island** button on the AutoTrack Parking Layout toolbar. Select the row you want to edit. Grips will appear in each island and the Parking Island Properties dialog will appear.

A screenshot of the 'Parking Island Properties' dialog box. It has a title bar with the text 'Parking Island Properties'. Inside, there are several sections of controls. The first section has a checked checkbox 'Footpath (shown if row has a footpath)'. The second section has a checked checkbox 'Custom non-standard properties' and two sub-sections: one with checked checkboxes 'Calculate island' and 'Draw island', and another with three text input fields: 'Offset to adjacent bay' (0.1), 'Bayside corner radius' (0.025), and 'Outer corner radius' (0.6). The third section has a text input field 'Minimum internal width' (0.5), a checked checkbox 'Allow width to increase', and a text input field 'Minimum width at kerb' (2). The fourth section has a checked checkbox 'Hatch' with 'Angle' (45) and 'Spacing' (0.5) fields, and an unchecked checkbox 'Cross hatch' with 'Angle' (-45) field. Below these are two buttons: 'Attributes' and 'Attribs'. The fifth section has a text input field 'Left access road angle' (90), a checked checkbox 'Lock left and right access road angles', and a text input field 'Right access road angle' (90). At the bottom are four buttons: 'Copy To', 'OK', 'Cancel', and 'Help'.

Parking Island Properties dialog

2. As you move the cursor over each island the properties dialog updates to show the island properties. All values will be displayed as read-only, i.e. non-editable.
3. As soon as you select an island the properties will become active, i.e. editable.
4. Tick **Footpath** if you want a row footpath to continue through the selected island. The same footpath option is shown on the row properties dialog and each updates when the other is changed.

#### Note

*If you tick this box but the row has no footpath defined, no footpath will be added to the island.*

5. If you want the island to differ from the standard tick **Custom non-standard properties** and change appropriate values.
6. The angles of ends of the start and end islands may be adjusted. This is often useful if an access road passes the end of the row. You can also edit the left side of the island separately from the right side if necessary. If the end of the island is angled uniformly across the width tick **Lock left and right access road angles**, and enter just the **Left access road angle**. If the left and right angles vary untick this box and additionally enter the **Right access road angle**.

---

## Editing parking row layout

### To move a row of bays



*Move Parking Row button*

1. Select Move Parking Row from the AutoTrack, Parking Tools menu or click the **Move Parking Row** button on the AutoTrack Parking Tools toolbar.
2. Select the row you wish to move.
3. Select the base point for the move.
4. Select the new position for the base point. The row will be redrawn in the new location.

### To rotate a row of bays



*Rotate Parking Row button*

1. Select Rotate Parking Row from the AutoTrack, Parking Tools menu or click the **Rotate Parking Row** button on the AutoTrack Parking Tools toolbar.
2. Select the row you wish to rotate.
3. Select the base point about which the row will be rotated.
4. Select the rotation angle. The row will be redrawn in the new location.

### To copy a row of bays



*Copy Parking Row button*

1. Select Copy Parking Row from the AutoTrack, Parking Tools menu or click the **Copy Parking Row** button on the AutoTrack Parking Tools toolbar.
2. Select the row you wish to copy. A copy of the row will appear.
3. Place the new row as you wish.

### To explode a row of bays

After a row of parking bays has been exploded it cannot be edited using AutoTrack parking tools. We therefore recommend that you **do not** explode your parking data without first making a backup copy.



*Explode Parking Row button*

1. Select Explode Parking Row from the AutoTrack, Parking Tools menu or click the **Explode Parking Row** button on the AutoTrack Parking Tools toolbar.
2. Select the row you wish to explode. The row will be exploded into simple drawing entities.



Delete Parking Row  
button

## To delete a row of bays

1. Select Delete Parking Row from the AutoTrack, Parking Tools menu or click the **Delete Parking Row** button on the AutoTrack Parking Tools toolbar.
2. Select the row you wish to delete. The row will be deleted without further warning.



Join Parking Row button

## To join two rows of parking bays

1. Select Join Parking Rows from the AutoTrack, Parking Tools menu or click the **Join Parking Rows** button on the AutoTrack Parking Tools toolbar.
2. Select the two rows you wish to join. The two rows will be extended or shortened, without changing the alignment of the rows, until they meet.



Extend Parking Row  
button

## To extend a row of parking bays

1. Select Extend Parking Row from the AutoTrack, Parking Tools menu or click the **Extend Parking Row** button on the AutoTrack Parking Tools toolbar.
2. Select the row you wish to extend. An arrow will appear at the end of the row closest to the cursor. As you move the cursor closer to the other end it will move to that end.
3. Move the cursor until the arrow is at the end you wish to extend and left click.
4. Now as you move the cursor the row will lengthen and shorten until you left click again. Notice that you can use this command to shorten a row beyond a bend.



Add Parking Row Vertex  
button

## To add a vertex to a row of parking bays

1. Select Add Parking Row Vertex from the AutoTrack, Parking Tools menu or click the **Add Parking Row Vertex** button on the AutoTrack Parking Tools toolbar.
2. Select the row you wish to extend. An arrow will appear at the end of the row closest to the cursor. As you move the cursor closer to the other end it will move to that end.
3. Move the cursor until the arrow is at the end you wish to extend and left click.
4. Now as you move the cursor a new segment will be created from the end you selected.

## To adjust a parking row

This is really a multi-purpose command that is available in AutoCAD and SavoyCAD by simply selecting a row.



Adjust Parking Row

1. Select Adjust Parking Row from the AutoTrack, Parking Tools menu or click the **Adjust Parking Row** button on the AutoTrack Parking Tools toolbar.
2. Select the row that you wish to adjust.
3. Small squares or “grips” will appear at various locations

*button*

along the row. Each may be used to adjust a different aspect of the row.

4. Select the single green grip to move the entire row.
5. Select the grip furthest from the end of the row to extend the row with a new segment. If you select the next grip in you can extend the row in line. Finally, select the grip exactly at the end of the row to move or extend the end of the row in any direction.
6. Select the outermost grips on the sides of the end islands to adjust the angle of that side of the end island. Use the next grip in to adjust both sides together.
7. At one end of the row there are grips beside each of the first bays. Use these to change the bay angle. Note that you can only set an angle defined in the selected standard.
8. Select the grip at each bend vertex to adjust the position of the bend.
9. Select the grips on the direction arrows to specify a different flow direction. To set the direction one way select the grip, move the cursor in the direction you want the flow and left click to confirm. To set two-way traffic, select the arrow, move the cursor alongside it and left click to confirm.



# Parking: Creating and editing standards

AutoTrack parking standards define the geometric rules for the layout of parking rows and bays.

---

## AutoTrack parking standards

All parking layouts are created in accordance with defined rules or standards.

A number of standards are provided with the program and these may be used as the basis for your own company standards. The standards are grouped by nationality so, for example, the UK parking standards are held within a file called `UK_xxx.ATP`, where `xxx` is the most recent version of AutoTrack that can read it, e.g. `UK_890.ATP`. Additional parking standards are available for different markets and can even be created by users themselves. However, to ensure that the details do not change arbitrarily, there are restrictions on who can edit them. These restrictions require that users identify themselves if they wish to access a standard to make changes. No password is needed simply to use a standard.

### Access to parking standards

Access to parking standards is restricted using a username / password system such that before a standard file can be opened for editing they must enter his or her name and password. Only if the user is authorised will they be allowed to open the standard file. There are three levels of access:-

#### None

You may list the standards but cannot access the details. This is the status of any standards that have not been purchased.

#### Read Only

You may use the standard file but may not change them or add new standards. All standard files are initially opened Read Only.

#### Full Access

You may use, copy, edit, or create new standards and add or edit the users.

All Savoy parking standards are Read Only.

Refer to [Viewing a standard in a parking standard file or the pool \(Parking Standard Explorer dialog\)](#) and [Creating a new parking standard file \(Parking Standard File dialog\)](#) for details of how to open standards files and maintain users.

## Access to parking standards in the Pool

Unlike vehicles, parking standards, once in the Pool, may be edited even if they have been used.

### Note

*If you make a copy of a standard in the same standard file it's name is prefixed with the words 'Copy of' to distinguish it from the original standard.*

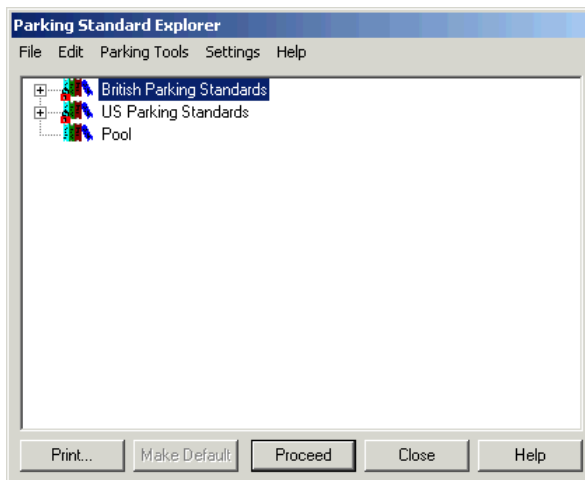
---

## Viewing a standard in a parking standard file or the pool (Parking Standard Explorer dialog) <sup>(4400)</sup>



Parking Standards button

1. Select **Parking Standard Explorer** from the AutoTrack, Parking Layout menu or click the **Parking Standard Explorer** button on the AutoTrack Parking Layout toolbar. The Parking Standard Explorer will appear. For details of the standards see [Viewing or editing parking standards](#).



Parking Standard Explorer dialog

2. If the standard that you require is not loaded then select **Open Parking Standard** from the **File** menu in the Parking Standards Explorer, browse to find the standards file and click **Open**. A new Parking Standards File icon will appear in the Parking Standards Explorer with the name of the standard file beside it.
3. Click on the + symbol to expand the standard file or the pool.
4. Standards may be listed under different groups. If they are then click the + symbol to expand the required group.
5. Highlight the required standard (indicated by a check list icon) and select **Edit** (or **View** if the standards file is locked) from the **Edit** menu. The Parking Standard dialog will appear.
6. If you wish to edit a Standard Group then highlight it and select **Edit** (or **View** if the standards file is locked) from the Edit menu. The Parking Standard Group dialog will appear.
7. To create a new parking standard, highlight the parent file or group and select **New Parking Standard** from the File menu.
8. To print a standard highlight it and select **Print** from the File

menu or click the **Print** button.

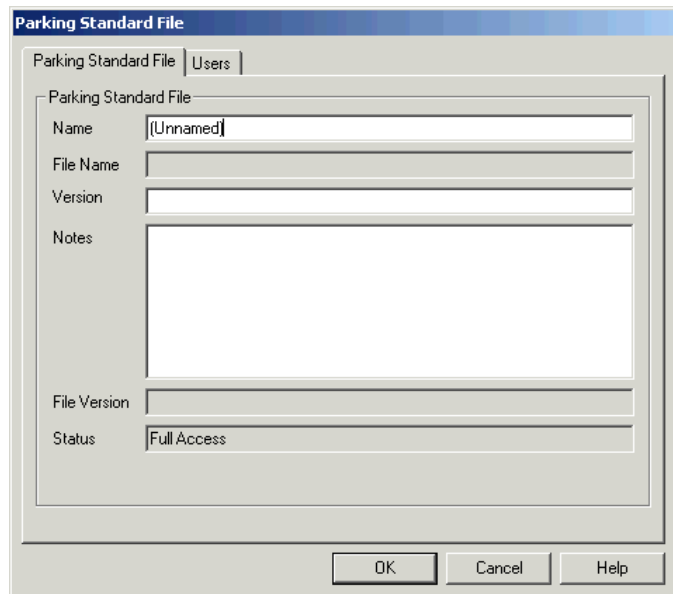
---

## Creating a new parking standard file (Parking Standard File dialog)



*Parking Standards  
button*

1. Select **Parking Standards** from the AutoTrack, Parking Layout menu or click the **Parking Standards** button on the AutoTrack Parking Layout toolbar. The Parking Standard Explorer dialog will appear.
2. Select **New Parking Standard File** from the File menu in the Parking Standard Explorer. The Parking Standard File dialog will appear.

The image shows the 'Parking Standard File' dialog box. It has a title bar with 'Parking Standard File' and two tabs: 'Parking Standard File' (selected) and 'Users'. The 'Parking Standard File' tab contains several input fields: 'Name' with '[Unnamed]' in it, 'File Name' (empty), 'Version' (empty), 'Notes' (a large text area), 'File Version' (empty), and 'Status' with 'Full Access' in it. At the bottom right are three buttons: 'OK', 'Cancel', and 'Help'.

Parking Standard File dialog

3. Click the appropriate tab to edit or view the settings.
4. Edit the data as required and click **OK** to confirm when you are satisfied. Click **Cancel** to abort all changes and close the dialog.

### Parking Standard File: Parking Standard File

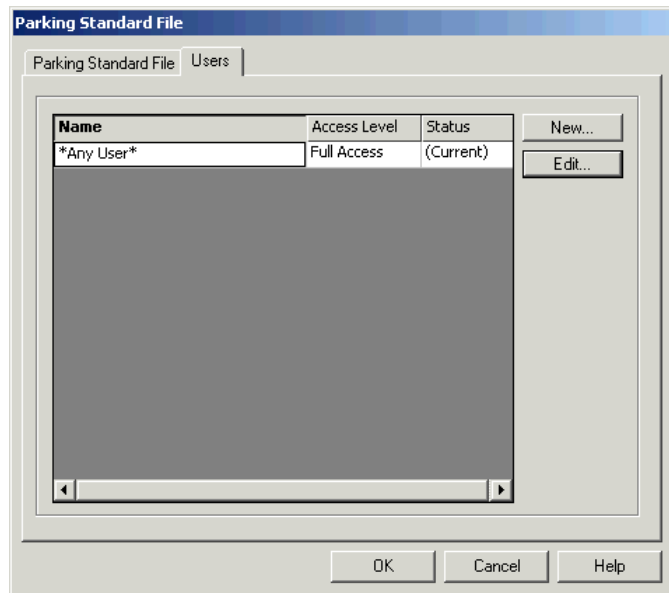
1. Click the Parking Standard File tab.
2. Give the standard file a meaningful **Name**.
3. The **Version** and **Notes** fields are provided for additional information and may be used at your discretion.
4. The **File Name** is read only and will be filled in when the file is saved.

### Parking Standard File: Users

#### 22. Note

*You may only add new users or edit existing users in standard files to which you have full access rights.*

1. Click on the **Users** tab.

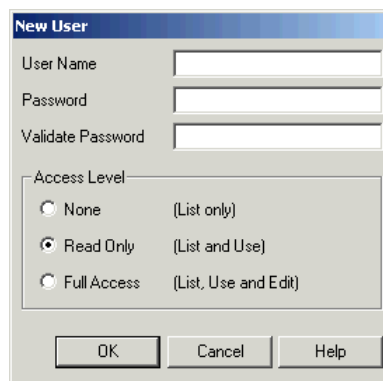


Parking Standard File: Users

2. On a new standard file all users have full access as indicated by the default entry in the Users table. At least one user in the table must have full access before you may downgrade the default Any User rights.

### ***To add a new user***

1. On the Parking Standard File dialog click **New**. The New User dialog will appear.



New User dialog

2. Enter the new **User Name**. Depending upon how you want to restrict access, this may be a specific person or a department name.
3. Enter the **Password** and then repeat it in the **Validate Password** field. This checks that you typed the password correctly. If you do not enter a password the named user will be able to unlock the standard file without typing a password.
4. Finally set the **Access Level**. We recommend that you add any users that you want to have full access and then downgrade the default Any User to Read Only.
5. Even tighter restrictions can be placed by downgrading Any

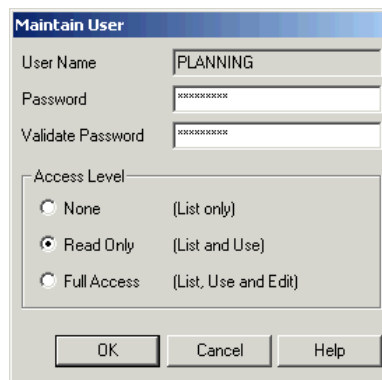
User to No Access and adding Read Only users as required. However, this may prove problematic in practice.

### ***To edit an existing user (Maintain User dialog)***

**23. Note**

*You may only add new users or edit existing users in libraries to which you have full access rights.*

1. On the Parking Standard File dialog highlight the user that you wish to edit and click **Edit**. The Maintain User dialog will appear.



Maintain User dialog

2. Change the **Password** and / or set a new **Access Level** and click **OK** to confirm. If you do not enter a password the named user will be able to unlock the standard file without typing a password.
3. Click **Cancel** to abort any changes.

**Note**

You cannot delete users; instead you must set their access level to **None**.

---

## **Saving a parking standard file**



*Parking Standards button*

1. Select **Parking Standards** from the AutoTrack, Parking Layout menu or click the **Parking Standards** button on the AutoTrack Parking Layout toolbar. The Parking Standard Explorer will appear.
2. Highlight the standard that you want to save, right click and select **Save Parking Standard File As** from the drop down menu that appears. The Save Parking Standard File As dialog will appear.
3. Browse to the required storage directory, enter the filename and click **Save**.
4. If the standard file already has a name then you can use **Save Parking Standard File**.

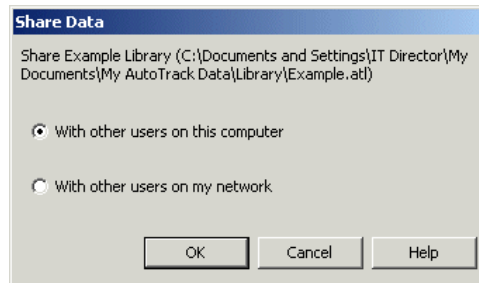
---

## **Sharing a parking standard (Share Data dialog)**



*Parking Standards  
button*

1. Select **Parking Standards** from the AutoTrack, Parking Layout menu or click the **Parking Standards** button on the AutoTrack Parking Layout toolbar. The Parking Standard Explorer will appear.
2. Highlight the standard that you want to share, right click and select **Share Data** from the drop down menu that appears.
3. The Share Data dialog will appear.



Share Data dialog

4. Select who you want to share the standard with and click **OK**.

If you select **With other users on this computer** a copy will be placed in the public data directory on your computer.

If you select **With other users on my network** a copy will be placed in the shared data directory (if one is defined).

---

## Copying standards and units using drag and drop

Parking standards are automatically copied to the Pool when they are used but you may wish to edit a standard before using it or indeed build your own parking standards.

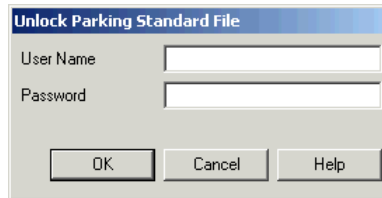
To copy a parking standard to the pool, select it, drag it over the Pool symbol and drop it. If you wish to copy it to another standard you will need full access rights in the destination parking standard file. The cursor will change to a no entry symbol to indicate areas where you may not drop the standard.

You can also make copies of parking standards within parking standard files in the same way; in this case the name of the standard is prefixed with the words 'Copy of ', to distinguish it from the original.

---

## Unlocking a parking standard file (Unlock Parking Standard File dialog) <sup>(3555)</sup>

1. Highlight the parking standard file that you want to unlock, right click and select **Unlock Parking Standard File** from the drop down menu that appears. If a password has been set for the standard file, the Unlock Parking Standard File dialog will appear. Otherwise, the standard file will be unlocked and you should refer to step 3.



Unlock Parking Standard File dialog

2. Enter your **User Name** and **Password** and click **OK**.
3. You will be granted whatever rights you have within the standard file. Thus, if you have full access rights within the current standard file then you will be able to change values in the unlocked standards; if, on the other hand you only have read only rights then you will only be able to use and copy the standards.

---

## Creating a new group



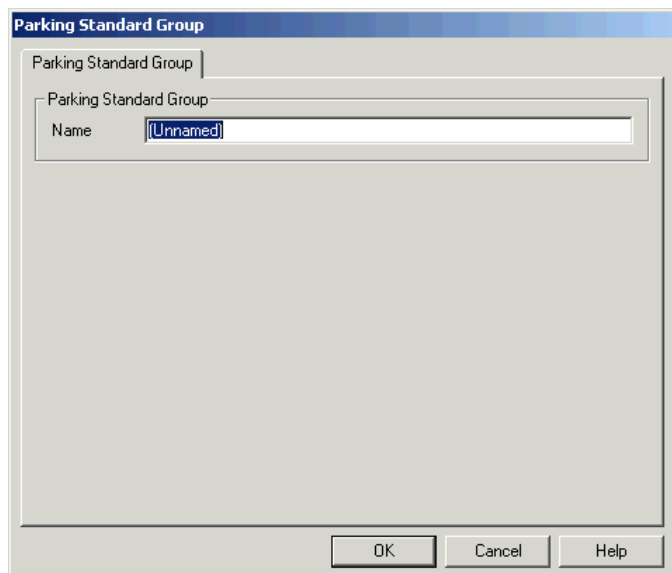
*Parking Standards button*

1. Select **Parking Standards** from the AutoTrack, Parking Layout menu or click the **Parking Standards** button on the AutoTrack toolbar. The Parking Standard Explorer will appear.
2. Highlight the parking standard file that you want to add a group to.
3. Right click and select **New, Parking Standard Group** from the menu. The [Parking Standard Group dialog <sup>\(4670\)</sup>](#) will appear.
4. Edit the details and click **OK** to confirm.

---

## Parking Standard Group dialog <sup>(4670)</sup>

1. The Parking Standard Group dialog lists the parking standard group details.



Parking Standard Group dialog

2. Edit the **Name** and click **OK** to confirm.

---

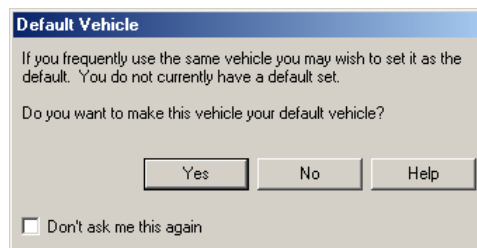
## Selecting a Parking Standard

### To set a default parking standard

1. Highlight the parking standard that you want to set as your default and click the **Make Default** button.
2. The next time you place a parking bay or row this standard will be used.

### Default Parking Standard dialog <sup>(4690)</sup>

1. AutoTrack allows you to define a default parking standard, i.e. a standard that will be used every time you place a parking bay unless you actively select an alternative. This can be very useful if you regularly use the same standard. If you select a standard to use and you do not have a default standard set the Default Parking Standard dialog will appear.



Default Parking Standard dialog

2. If you select **Yes** then this standard will be selected automatically next time you place a parking bay. If you select **No** then you will be asked this again the next time you select a standard in similar circumstances.
3. If you don't want to be asked again then tick **Don't ask me this again**.

---

## Viewing or editing parking standards

Parking standards supplied by Savoy can only be edited once they have been selected for a project. Then, any changes you make to the standard will affect not only new bays but also any bays that have already been placed. Once you have used a standard all bays placed will use that standard.

You may edit parking standards that you create. However, in order to prevent accidental changes, they will be locked when you close AutoTrack and you will need to unlock them to make any changes.

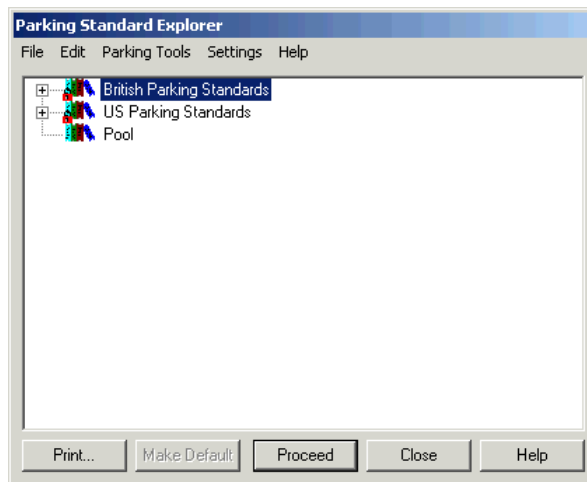
### To edit a parking standard



*Parking Standards  
button*

1. Select **Parking Standards** from the AutoTrack, Parking Layout menu or click the **Parking Standards** button on the AutoTrack Parking Layout toolbar. The Parking Standard Explorer dialog will appear.





Parking Standard Explorer dialog

2. If the standard file that you require is not loaded then select **Open Parking Standard** from the **File** menu in the Parking Standard Explorer, browse to find the standard file and click **Open**. A new parking standard icon will appear in the Parking Standard Explorer with the name of the standard file beside it.
3. Click on the + symbol to expand the standard file or the pool.
4. Click the + symbol adjacent to the required group if necessary.
5. Highlight the required standard (indicated by a check sheet symbol dependant) and select **Edit** (or **View** if the Standard is locked) from the Edit menu. The Parking Standard dialog will appear.
6. If you wish to edit a parking standard group then highlight it and select **Edit** (or **View** if the standard file is locked) from the **Edit** menu in the Parking Standard Explorer. The Parking Standard Group dialog will appear.
7. To create a new parking standard highlight the parent file or group, right click and select **New Parking Standard** from the menu that appears.

## Parking Standard: General <sup>(4500)</sup>

1. Click on the **General** tab.

The screenshot shows the 'Parking Standard' dialog box with the 'General' tab selected. The dialog has a title bar 'Parking Standard' and a tabbed interface. The tabs are: Safety Posts, Privacy Posts, Wheel Stops, Construction Lines, Parking Meters, Bay Markings, Bay Symbols, Safety Zones, Bay Styles, Vehicle Classes, Service Types, Valid Bay Angles, Bay Dimensions, General, End Islands, Bend Islands, In Bay Numbering, and Kerbside Bay Numbering. The 'General' tab is active, showing fields for Name, Source, Notes, and Units. The Name field contains 'Design Bulletin 32', the Source field contains 'Design Bulletin 32 Second Edition', and the Units dropdown is set to 'metres'. The Notes field is a large empty text area. At the bottom are buttons for OK, Cancel, Apply, and Help.

Parking Standard			
Safety Posts	Privacy Posts	Wheel Stops	Construction Lines
Parking Meters	Bay Markings	Bay Symbols	Safety Zones
Bay Styles	Vehicle Classes	Service Types	Valid Bay Angles
Bay Dimensions	General	End Islands	Bend Islands
In Bay Numbering	Kerbside Bay Numbering		

General

Name: Design Bulletin 32

Source: Design Bulletin 32 Second Edition

Notes:

Units: metres

OK Cancel Apply Help

Parking Standard: General tab

2. The **Name**, **Source** and **Notes** allow you to specify the standard. Even though these fields are not compulsory we nevertheless recommend that you complete them since they are useful reminders when you come to reuse the standard at a later date.
3. Set the preferred **Units** using the drop down list box.

## Parking Standard: End Islands (4480)

End islands are placed at the ends of a row of parking bays.

1. Click on the **End Islands** tab.

The screenshot shows the 'Parking Standard' dialog box with the 'End Islands' tab selected. The dialog has a tabbed interface with the following tabs: Safety Posts, Privacy Posts, Wheel Stops, Construction Lines, Parking Meters, Bay Markings, Bay Symbols, Safety Zones, Bay Styles, Vehicle Classes, Service Types, Valid Bay Angles, Bay Dimensions, General, End Islands (selected), Bend Islands, In Bay Numbering, and Kerbside Bay Numbering. The 'End Islands' tab contains the following settings:

- Offset to adjacent bay: 0.1
- Bayside corner radius: 0.025
- Outer corner radius: 0.6
- Minimum internal width: 0.5
- Minimum width at kerb: 2
- ☒ Hatch: Angle 45, Spacing 0.5
- ☐ Cross hatch: Angle -45
- ☒ Allow width to increase
- ☒ Draw island
- Line style: (dropdown menu)

At the bottom of the dialog are buttons for OK, Cancel, Apply, and Help.

Parking Standard: End Islands tab

2. Set the **Offset to adjacent bay** to the distance from the start of the end island to the side marking of the last bay.
3. Set the **Bayside corner radius** to the radius of the corners of the island that meet the bay.
4. Set the **Outer corner radius** to the radius of the corners of the island that are adjacent to the access road.
5. Set the **Minimum internal width** to the minimum width of the island at any point.
6. Tick **Allow width to increase** to allow the island stretch sideways.
7. Set the **Minimum width at kerb** to the minimum width of the island where it meets the kerb, i.e. on the baseline.
8. Tick **Draw island** to show the island. Note that even if this option is not ticked the island is still calculated and the space allocated.
9. Tick **Hatch** and / or **Cross hatch** to display a hatch pattern within the island. You may adjust the hatch **Spacing** and **Angle**.
10. Click the **Attributes** button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).

## Parking Standard: Bend Islands (4470)

Bend islands are placed at changes in direction of a row of parking bays.

1. Click on the **Bend Islands** tab.

The screenshot shows the 'Parking Standard' dialog box with the 'Bend Islands' tab selected. The dialog has a title bar 'Parking Standard' and a tabbed interface. The 'Bend Islands' tab is active, showing the following settings:

- Offset to adjacent bays:** 0.1
- Bayside corner radius:** 0.025
- Outer corner radius:** 0.6
- Minimum internal width:** 0.1
- Minimum width at kerb:** 0.5
- Hatch:** ☒ (Angle: 45, Spacing: 0.5)
- Cross hatch:** ☐ (Angle: -45)
- Allow width to increase:** ☒
- Draw island:** ☒
- Line style:** (dropdown menu)

At the bottom of the dialog are buttons for 'OK', 'Cancel', 'Apply', and 'Help'.

Parking Standard: Bend Islands tab

2. Set the **Offset to adjacent bays** to the distance from the start of the island to the side marking of the adjacent bays.
3. Set the **Bayside corner radius** to the radius of the corners of the island that meet the bay.
4. Set the **Outer corner radius** to the radius of the corners of the island that are adjacent to the access road.
5. The **Minimum internal width** is the minimum width of the island at any point.
6. Tick **Allow width to increase** to allow the island stretch sideways.
7. Set the **Minimum width at kerb** to the minimum width of the island where it meets the kerb, i.e. on the baseline.
8. Tick **Draw island** to show the island. Note that even if this option is not ticked the island is still calculated and the space allocated.
9. Tick **Hatch** and / or **Cross hatch** to display a hatch pattern within the island. You may adjust the hatch **Spacing** and **Angle**.
10. Click the **Attributes** button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).

## Parking Standard: In Bay Numbering <sup>(4510)</sup>

In bay numbering is when bay numbers are painted within the area of the parking bay.

1. Click on the **In Bay Numbering** tab.

The screenshot shows the 'Parking Standard' dialog box with the 'In Bay Numbering' tab selected. The dialog has a title bar 'Parking Standard' and a tabbed interface. The tabs include: Safety Posts, Privacy Posts, Wheel Stops, Construction Lines, Parking Meters, Bay Markings, Bay Symbols, Safety Zones, Bay Styles, Vehicle Classes, Service Types, Valid Bay Angles, Bay Dimensions, General, End Islands, Bend Islands, In Bay Numbering (selected), and Kerbside Bay Numbering. The 'In Bay Numbering' section contains the following controls:

- Width of number:** A text input field with the value '0'.
- Height of number:** A text input field with the value '0.6'.
- Line style:** A button with a red line icon.
- Roman numerals:** An unchecked checkbox.
- Number first bay:** A checked checkbox.
- Number last bay:** A checked checkbox.
- Number intermediate bays:** An unchecked checkbox.
- Offset from end of bay:** A text input field with the value '0.3'.
- Place in centre:** An unchecked checkbox.
- Place number at kerb end of bay:** An unchecked checkbox.
- Rotation:** A text input field with the value '0'.

Below the input fields is a note: '(zero is towards the front of the bay)'. At the bottom of the dialog are four buttons: OK, Cancel, Apply, and Help.

Parking Standard: In Bay Numbering tab

2. Set the **Width of number** to the preferred width of each character.
3. Set the **Height of number** to the preferred height of each character.
4. Tick **Roman numerals** to display the number in roman numeral format.
5. Tick **Number first bay**, **Number last bay** and / or **Number intermediate bays** to specify which bays should be numbered in the bay.
6. Set the **Offset from end of bay** to the distance from the end of the bay to the centre of the number.
7. Tick **Place in centre** to place the number centrally in the bay.
8. Tick **Place number at kerb end of bay** to offset the number from the kerb end of the bay instead of from the entrance end.
9. Set the **Rotation** to the required orientation for the number. If set to zero the number will face the driver entering the bay.
10. Click the **Line Style** button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).

## Parking Standard: Kerbside Bay Numbering <sup>(4520)</sup>

Kerbside bay numbering is when bay numbers are painted either beside or at the end of the parking bays.

1. Click on the **Kerbside Bay Numbering** tab.

The screenshot shows the 'Parking Standard' dialog box with the 'Kerbside Bay Numbering' tab selected. The dialog has a title bar 'Parking Standard' and a tabbed interface. The tabs include: Safety Posts, Privacy Posts, Wheel Stops, Construction Lines, Parking Meters, Bay Markings, Bay Symbols, Safety Zones, Bay Styles, Vehicle Classes, Service Types, Valid Bay Angles, Bay Dimensions, General, End Islands, Bend Islands, In Bay Numbering, and Kerbside Bay Numbering. The 'Kerbside Bay Numbering' tab is active, showing the following settings:

- Kerbside Bay Numbering** (Section Header)
- Width of number**: 0.1
- Height of number**: 0.2
- ☒ **Number first bay**
- ☒ **Number last bay**
- ☒ **Number intermediate bays**
- Offset from end of bay**: 0.3
- ☒ **Offset from kerb**
- Offset from side of bay**: 0
- ☒ **Place in centre**
- Rotation**: 0 (zero is facing away from an incoming driver)
- Line style**: (A button to open the line style dialog)

At the bottom of the dialog are buttons for OK, Cancel, Apply, and Help.

Parking Standard: Kerbside Numbering tab

2. Set the **Width of number** to the preferred width of each character.
3. Set the **Height of number** to the preferred height of each character.
4. Tick **Roman numerals** to display the number in roman numeral format.
5. Tick **Number first bay**, **Number last bay** and / or **Number intermediate bays** to specify which bays should be numbered in the bay.
6. Set the **Offset from end of bay** to the distance from the end of the bay to the centre of the number.
7. Tick **Offset from kerb** to measure the offset from the kerb rather than the end of the bay.
8. Set the **Offset from side of bay** to the distance from the drivers side line to the centre of the number.
9. Set the **Rotation** to the required orientation for the number. If set to zero the number will face the driver entering the bay.
10. Click the **Line Style** button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).

## Parking Standard: Vehicle Classes <sup>(4640)</sup>

Vehicles that might use the parking area are split into groups known as vehicle classes. Typically each vehicle class has different parking requirements.

1. Click on the **Vehicle Classes** tab.

The screenshot shows the 'Parking Standard' dialog box with the 'Vehicle Classes' tab selected. The dialog has a tabbed interface with the following tabs: Safety Posts, Privacy Posts, Wheel Stops, Construction Lines, Parking Meters, Bay Markings, Bay Symbols, Safety Zones, Bay Styles, General, End Islands, Bend Islands, In Bay Numbering, Kerbside Bay Numbering, Vehicle Classes (selected), Service Types, Valid Bay Angles, and Bay Dimensions. The 'Vehicle Classes' tab contains a list box with 'Standard' selected. To the right of the list box are 'New' and 'Delete' buttons. Below the list box are three input fields: 'Class name' (containing 'Standard'), 'Default bay length' (containing '4.8'), and 'Default bay width' (containing '2.4'). At the bottom of the dialog are 'OK', 'Cancel', 'Apply', and 'Help' buttons.

Parking Standard: Vehicle Classes tab

2. The defined vehicle classes are listed in the large window. As you move the cursor between the entries the edit boxes beneath show the values associated with the selected vehicle class.
3. Set the **Vehicle class** to the name of the class.
4. Set the **Default bay length** to the length of bay required for this class of vehicle.
5. Set the **Default bay width** to the width of bay required for this class of vehicle.
6. Click **New** to add a new vehicle class. Highlight a vehicle class and click **Duplicate** to create a copy of an existing class or click **Delete** to delete the selected class.

## Parking Standard: Service Types <sup>(4570)</sup>

Each parking area has particular access requirements which for ease of reference are called service types.

1. Click on the **Service Types** tab.

The screenshot shows the 'Parking Standard' dialog box with the 'Service Types' tab active. The 'Service Types' list contains one entry, 'Standard'. To the right of the list are buttons for 'New', 'Delete', and 'Duplicate'. Below the list, the 'Service type name' field is set to 'Standard'. The 'One way aisle width' is 5, 'Two way aisle width' is 6, and 'Footpath width' is 2. The 'One way access road width' is 3 and the 'Two way access road width' is 5.5. At the bottom of the dialog are 'OK', 'Cancel', 'Apply', and 'Help' buttons.

Parking Standard: Service Types tab

2. The defined service types are listed in the large window. As you move the cursor between the entries the edit boxes beneath show the values associated with the selected service type. Note that the aisle widths listed here are the base values used to create the bay dimensions table.
3. Set the **One way aisle width** to the width of aisle required for one way vehicle circulation past the entrances to the bays.
4. Set the **Two way aisle width** to the width of aisle required for two way vehicle circulation past the entrances to the bays.
5. Set the **One way access road width** to the minimum width of road required for one way circulation in the access roads feeding the row aisles.
6. Set the **Two way access road width** to the minimum width of road required for two way circulation in the access roads feeding the row aisles.
7. Set the **Footpath width** to the preferred width of footpath between back to back parking bays.
8. Click **New** to add a new service type. Highlight a service type and click **Duplicate** to create a copy of an existing type or click **Delete** to delete the selected type.



## Parking Standard: Valid Bay Angles <sup>(4630)</sup>

In order to create an optimum parking layout it is normally desirable to limit the angles at which vehicles may park.

1. Click on the **Valid Bay Angles** tab.

The screenshot shows the 'Parking Standard' dialog box with the 'Valid Bay Angles' tab selected. The dialog has a title bar 'Parking Standard' and a tabbed interface. The tabs include: Safety Posts, Privacy Posts, Wheel Stops, Construction Lines, Parking Meters, Bay Markings, Bay Symbols, Safety Zones, Bay Styles, General, End Islands, Bend Islands, In Bay Numbering, Kerbside Bay Numbering, Vehicle Classes, Service Types, Valid Bay Angles (selected), and Bay Dimensions. The 'Valid Bay Angles' tab contains a list box titled 'Valid Bay Angles' with the following values: 0.000000, 30.000000, 45.000000, 60.000000, and 90.000000. The value 90.000000 is highlighted. To the right of the list box are two buttons: 'New' and 'Delete'. Below the list box is a text field labeled 'Bay angle' with the value '90' entered. At the bottom of the dialog are four buttons: 'OK', 'Cancel', 'Apply', and 'Help'.

Parking Standard: Valid Bay Angles tab

2. Valid angles are listed in the large window.
3. To edit an angle highlight it in the list and edit the value in the **Bay angle** edit box beneath.
4. Click **New** to add a new angle.
5. Highlight an angle and click **Delete** to remove an angle from the list.

## Parking Standard: Bay Dimensions (4600)

The principal bay dimensions are simply the length and width. Default values for these vary according to the vehicle class, service type, and bay angle.

1. Click on the **Bay Dimensions** tab.

Service	Standard	Standard	Standard	Standard	Standard
Vehicle	Standard	Standard	Standard	Standard	Standard
Angle	90.00Deg	60.00Deg	45.00Deg	30.00Deg	0.00Deg
Width	2.40	2.40	2.40	2.40	6.00
Length	4.80	4.85	4.81	4.84	2.40
Depth	4.80	5.40	5.10	4.50	2.40
1 Way	6.00	4.20	3.60	3.60	5.40
2 Way	6.00	4.20	3.60	3.60	5.40

Parking Standard: Bay Dimensions tab

2. The window shows the bay dimensions for every combination of service type, vehicle class and bay angle. The default **Length** and **Width** are taken from the values for the vehicle class. The **Depth** (the distance from the baseline to the entrance line) is calculated from simple geometry based upon the bay angle. Any or all values may be over-written with preferred values.
3. The default **1 Way** and **2 Way** aisle widths are taken from the values for the service type. They may be over-written with preferred values.
4. All values taken from the standard are shown in blue, calculated values are shown in red and explicitly entered values are shown in black.
5. Current parking standards often require that the default values are over-ridden. For example, the aisle width required for angled bays is normally less than that required for 90 degree bays. To change a value simply click in the field and enter the new value.

## Parking Standard: Parking Meters <sup>(4530)</sup>

This dialog defines the characteristics of parking meters (if provided).

1. Click on the **Parking Meters** tab.

The screenshot shows the 'Parking Standard' dialog box with the 'Parking Meters' tab selected. The dialog contains the following fields and options:

- Post diameter:** 0.05
- Meter width:** 0.05
- Meter length:** 0.1
- Offset from end of bay:** 0.5
- Offset from side of bay:** 0
- Shared meters:** ☐
- Line style:** (dropdown menu)
- Meter head spacing:** 0.075
- Offset from kerb:** ☐
- Place in centre:** ☐

At the bottom of the dialog are buttons for 'OK', 'Cancel', 'Apply', and 'Help'.

Parking Standard: Parking Meters

2. The **Post diameter**, **Meter width** and **Meter length** allow you to define a shape representing the meter.
3. The **Offset from end of bay** is the distance of the meter from the kerb end of the bay.
4. Tick **Offset from kerb** to offset the meter from the kerb rather than the end of the bay. Note that this only affects angled bays.
5. The **Offset from side of bay** is the distance of the meter from the drivers side line.
6. Tick **Place in centre** to display the parking meter in the centre of the bay.
7. Tick **Shared meters serving adjacent bays** to place double headed meters.
8. Set **Meter head spacing** to show the twin meter heads.
9. Click the **Line Style** button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).

## Parking Standard: Bay Markings (4580)

The bay markings include the line types and colours, the hatch format and the T-marking size.

1. Click on the **Bay Markings** tab.

The screenshot shows the 'Parking Standard' dialog box with the 'Bay Markings' tab selected. The dialog contains a list of bay markings, with 'Default' selected. Below the list, there are various configuration options for the selected bay marking. The 'Bay marking name' is 'Default'. The 'All line styles identical' checkbox is checked. The 'Side lines' checkbox is checked. The 'Base line' checkbox is checked. The 'Entrance line' checkbox is unchecked. The 'Sideline T-markings' checkbox is checked. The 'Hatch' checkbox is unchecked. The 'Angle' is set to 45. The 'Spacing' is set to 0.5. The 'Sideline offset' is set to 0.5. The 'Side line hairpin separation' is set to 0.1. The 'Leg length of T marking' is set to 0.5. The 'Cross width of T marking' is set to 0.5. The 'Cross hatch' checkbox is checked. The 'Angle' for the cross hatch is set to -45. Buttons for 'New', 'Delete', 'Duplicate', 'OK', 'Cancel', 'Apply', and 'Help' are visible at the bottom.

Parking Standard: Bay Marking tab

2. The defined bay markings are listed in the large window. As you move the cursor between the entries the edit boxes beneath show the values associated with the selected bay marking.
3. Tick **All line styles identical** if all bay markings use the same colour, line type and line weight. This will disable all the other attribute buttons. Click the adjacent button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).
4. Tick **Side lines** if you want a line full length down each side of each bay. Click the adjacent button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).
5. The **Sideline offset** is the distance from the baseline to the start of each of the side lines.
6. Some places the side lines are drawn double joint at the baseline and called hairpins. The **Side line hairpin separation** is the spacing of the two side lines.
7. Tick **Base line** if you want a line drawn along the kerb end of each bay. Click the adjacent button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).
8. Tick **Entrance line** if you want a line drawn across the entrance of each bay. Click the adjacent button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).
9. Tick **Sideline T markings** if you want T marking at the intersection of the sides and entrance of each bay. Note that this may be in addition to, or instead of, side and / or entrance lines.

Click the adjacent button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).

10. The **Leg length of T marking** is the length of the vertical of the T marking.
11. The **Cross width of T marking** is the width of the horizontal of the T marking.
12. Tick **Hatch** and / or **Cross hatch** to display a hatch pattern. You may adjust the hatch **Spacing** and **Angle**.
13. Click **New** to add a new bay marking. Highlight a bay marking and click **Duplicate** to create a copy of an existing bay marking or click **Delete** to delete the selected marking.

## Parking Standard: Bay Symbols (4620)

This dialog allows you to define bay symbols and includes type (e.g. disabled markings), size, colour and location. It also caters for additional text.

1. Click on the **Bay Symbols** tab.

The screenshot shows the 'Parking Standard' dialog box with the 'Bay Symbols' tab selected. The dialog has a tabbed interface with the following tabs: Safety Posts, Privacy Posts, Wheel Stops, Construction Lines, General, End Islands, Bend Islands, In Bay Numbering, Kerbside Bay Numbering, Vehicle Classes, Service Types, Valid Bay Angles, Bay Dimensions, Parking Meters, Bay Markings, Bay Symbols (selected), Safety Zones, and Bay Styles. The 'Bay Symbols (set in Bay Styles)' section contains a list box with 'Default' and 'Disabled' (selected). To the right of the list box are 'New', 'Delete', and 'Duplicate' buttons. Below the list box are input fields for 'Bay symbol name' (Disabled), 'Symbol' (Disabled, with a color/line type selector), 'Symbol offset' (2, with a checkbox for 'Place in centre of bay'), 'Symbol height' (1.5), 'Text' (empty, with a color/line type selector), 'Text offset' (0.5, with a checkbox for 'Place in centre of bay'), 'Text height' (1, with a 'Width' field set to 2), and 'Text rotation' (0). At the bottom are 'OK', 'Cancel', 'Apply', and 'Help' buttons.

Parking Standard: Bay Symbols tab

2. The defined bay symbols are listed in the large window. As you move the cursor between the entries the edit boxes beneath show the values associated with the selected bay symbol.
3. The **Symbol** is the icon that will be drawn in the bay. Click the adjacent button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).
4. The **Symbol Offset** is the distance from the entrance line to the centre of the symbol.
5. Tick **Place in centre of bay** to place the symbol halfway between the entrance line and the baseline.
6. The **Symbol height** is the overall height of the selected symbol. The symbol proportions are constrained so there is no need to enter a width.
7. You may place a text instead of, or as well as, a symbol. The **Text** is the text that will be displayed in the bay. Click the adjacent button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).
8. The **Text Offset** is the distance from the entrance line to the centre of the text.
9. Tick **Place in centre of bay** to place the text halfway between the entrance line and the baseline.
10. The **Text height** is the text character height.

11. The **Width** is the overall width of the text string, not the individual character width.
12. The **Text Rotation** is the orientation of the text. If set to zero the text will face the driver entering the bay.

## Parking Standard: Safety Zones (4560)

This dialog allows you to define extra space around parking bays for special uses, e.g. for disabled drivers.

1. Click on the **Safety Zones** tab.

The screenshot shows the 'Parking Standard' dialog box with the 'Safety Zones' tab active. The dialog has a title bar and a tabbed interface. The 'Safety Zones' tab is selected, showing a list of safety zones: 'Disabled (Multiple)', 'Disabled (Single)', and 'None'. Below the list are input fields for 'Safety zone name', 'Extra on driver side' (0.6), 'Extra on passenger side' (0), 'Extra on entrance' (0), 'Offset from bay' (0), 'Corner radius' (0), and checkboxes for 'Hatch' and 'Cross hatch'. There are also fields for 'Angle' (45) and 'Spacing' (0.5). A 'Line style' button is on the right. At the bottom are 'OK', 'Cancel', 'Apply', and 'Help' buttons.

Parking Standard: Safety Zones tab

2. The defined safety zones are listed in the large window. As you move the cursor between the entries the edit boxes beneath show the values associated with the selected safety zone.
3. The **Extra on driver side** is the extra width required on the driver's side of the bay.
4. The **Extra on passenger side** is the extra width required on the passenger's side of the bay.
5. The **Extra on entrance** is the extra length required at the entrance of the bay.
6. The **Offset from bay** is the distance from the bay side line to the start of the safety zone markings.
7. The **Corner radius** is the radius to be applied to the corners of the safety zone.
8. Tick **Draw safety zones** to show the safety zone markings. Note that this option merely switches off the display of the markings, the safety zone area is still calculated and taken into account when determining bay layout.
9. Tick **Share safety zones** to allow the extra area allocated for adjacent safety zones to overlap.
10. Tick **Hatch** and / or **Cross hatch** to display a hatch pattern within the safety zone. You may adjust the hatch **Spacing** and **Angle**.
11. Click the **Line Style** button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).



12. Click **New** to add a new safety zone. Highlight a safety zone and click **Duplicate** to create a copy of an existing safety zone or click **Delete** to delete the selected zone.

## Parking Standard: Bay Styles <sup>(4610)</sup>

This dialog lets you define bay styles by combining bay markings, safety zones, bay symbols, etc.

1. Click on the **Bay Styles** tab.

The screenshot shows the 'Parking Standard' dialog box with the 'Bay Styles' tab active. The 'Bay Styles (select to set current style)' list contains 'Disabled' and 'Normal'. The 'Normal' style is selected, and its details are shown in the fields below: 'Bay style name' is 'Normal', 'Bay marking' is 'Default', 'Safety zone' is 'None', and 'Bay symbol' is 'Default'. There are also checkboxes for 'Custom bay width' (unchecked), 'Allow width to increase' (unchecked), 'Number bay' (checked), 'Number kerb' (checked), 'Ignore this bay style for reporting' (unchecked), 'Wheel stop' (checked), 'Safety post' (checked), 'Privacy post' (checked), and 'Parking meter' (checked). Buttons for 'New', 'Delete', 'Duplicate', 'OK', 'Cancel', 'Apply', and 'Help' are visible.

Parking Standard: Bay Styles tab

2. The defined bay styles are listed in the large window. As you move the cursor between the entries the edit boxes beneath show the values associated with the selected bay style.
3. The **Bay marking** is the bay marking to be used with the selected bay style. To add a bay marking to the list click the **More** button (...) adjacent to the drop down list.
4. The **Safety zone** is the safety zone to be used with the selected bay style. To add a safety zone to the list click the **More** button (...) adjacent to the drop down list.
5. The **Bay symbol** is the bay symbol to be used with the selected bay style. To add a bay symbol to the list click the **More** button (...) adjacent to the drop down list.
6. Tick **Custom bay width** to set a non-standard width and set **Width**.
7. Tick **Allow width to increase** to ensure that a proportion of any extra space available is added to the width of bays of this type.
8. Tick **Number bay** and / or **Number kerb** to add bay numbering in the bay or on the kerbside. The numbering format is defined within the standard. Note that, depending upon the numbering definition in the standard, not all bays will necessarily be numbered.
9. Tick **Wheel stop**, **Privacy post**, **Safety post** and / or **Parking meter** to add these features to the selected bay type.

## Parking Standard: Safety Posts (4550)

Safety posts are generally placed at the ends of bays and prevent vehicles from accidentally hitting pedestrians.

1. Click on the **Safety Posts** tab.

The screenshot shows the 'Parking Standard' dialog box with the 'Safety Posts' tab selected. The dialog has a title bar 'Parking Standard' and a tabbed interface. The tabs include: General, End Islands, Bend Islands, In Bay Numbering, Kerbside Bay Numbering, Vehicle Classes, Service Types, Valid Bay Angles, Bay Dimensions, Parking Meters, Bay Markings, Bay Symbols, Safety Zones, Bay Styles, Safety Posts (selected), Privacy Posts, Wheel Stops, and Construction Lines. The 'Safety Posts' section contains the following fields and options: 'Post diameter' with a value of 0.2, 'Width' with a value of 0.2, 'Length' with a value of 0.6, 'Offset from end of bay' with a value of 0.5, and a checkbox 'Align with kerb' which is checked. There is also a 'Line style' button with a green line icon. At the bottom of the dialog are buttons for 'OK', 'Cancel', 'Apply', and 'Help'.

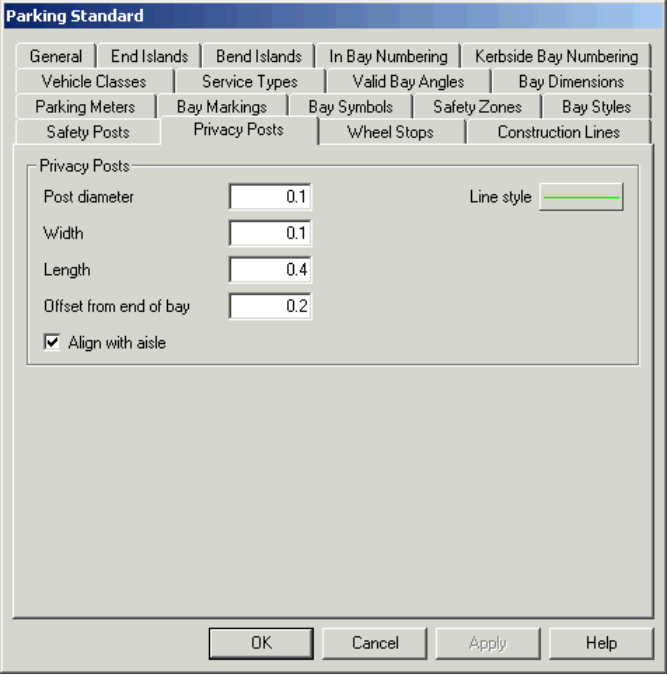
Parking Standard: Safety Posts tab

2. The **Post diameter** is the diameter of the safety post.
3. The **Width** is the width of the safety barrier, i.e. the distance measured in the direction of the bay width.
4. The **Length** is the length of the safety barrier, i.e. the distance measured in the direction of the bay length.
5. The **Offset** is the distance from the centre of the safety post to the end of the bay.
6. Tick **Offset from kerb** to measure the offset from the kerb instead of the end of the bay. Note this will only affect angled bays.
7. Click the **Line Style** button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).

## Parking Standard: Privacy Posts (4540)

Privacy posts are placed at the entrances to personal parking bays to prevent unauthorized use.

1. Click on the **Privacy Posts** tab.



The screenshot shows the 'Parking Standard' dialog box with the 'Privacy Posts' tab selected. The dialog has a title bar 'Parking Standard' and a tabbed interface. The tabs include: General, End Islands, Bend Islands, In Bay Numbering, Kerbside Bay Numbering, Vehicle Classes, Service Types, Valid Bay Angles, Bay Dimensions, Parking Meters, Bay Markings, Bay Symbols, Safety Zones, Bay Styles, Safety Posts, Privacy Posts (selected), Wheel Stops, and Construction Lines. The 'Privacy Posts' section contains the following fields and controls:

- Post diameter**: A text input field with the value '0.1'.
- Width**: A text input field with the value '0.1'.
- Length**: A text input field with the value '0.4'.
- Offset from end of bay**: A text input field with the value '0.2'.
- Line style**: A button with a green line icon.
- Align with aisle**: A checked checkbox.

At the bottom of the dialog are four buttons: OK, Cancel, Apply, and Help.

Parking Standard: Privacy Posts tab

2. The **Post diameter** is the diameter of the privacy post.
3. The **Width** is the width of a privacy barrier, i.e. the distance measured in the direction of the bay width.
4. The **Length** is the length of a privacy barrier, i.e. the distance measured in the direction of the bay length.
5. The **Offset** is the distance from the centre of the privacy post to the end of the bay.
6. Tick **Offset from kerb** to measure the offset from the kerb instead of the end of the bay. Note this will only affect angled bays.
7. Click the **Line Style** button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).

## Parking Standard: Wheel Stops <sup>(4650)</sup>

Wheel stops are placed a short distance back from the end of the bay and prevent vehicles from overhanging the end.

1. Click on the **Wheel Stops** tab.

**Parking Standard**

General | End Islands | Bend Islands | In Bay Numbering | Kerbside Bay Numbering

Vehicle Classes | Service Types | Valid Bay Angles | Bay Dimensions

Parking Meters | Bay Markings | Bay Symbols | Safety Zones | Bay Styles

Safety Posts | Privacy Posts | **Wheel Stops** | Construction Lines

Wheel Stops (always perpendicular to bay sides)

Width: 0.2 Line style: [Line style button]

Length: 0.5 or ☐ Stretch to fill bay width

Top width indent: 0.05 ☒ Shared wheel stops

Top length indent: 0.05

Offset from end of bay: 0.76

Offset from side of bay: 0.1 or ☐ Place in centre of bay

OK Cancel Apply Help

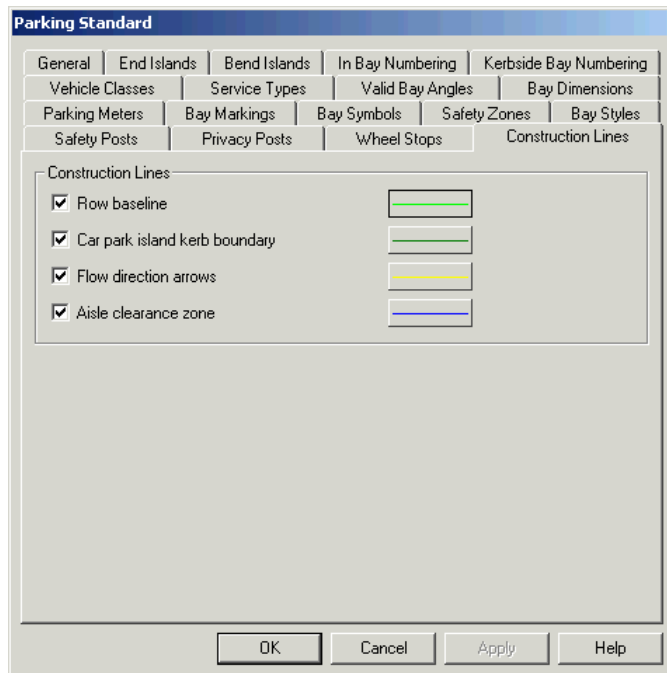
Parking Standard: Wheel Stops tab

2. The **Width** of the wheel stop is measured in the direction of the length of the bay.
3. The **Length** of the wheel stop is measured in the direction of the width of the bay.
4. Tick **Stretch to fill bay width** to place wheel stops across the entire width of the bay.
5. Tick **Shared wheel stops** to place wheel stops on the dividing line between two adjacent bays. If you tick this option then you will no longer be able to place the wheel stop using **Offset from side of bay** or **Place in centre of bay**.
6. The **Top width indent** is the taper in the width of the wheel stop, e.g. if the base width is 0.3m and the width at the top is 0.2m then the top width indent is 0.05m.
7. The **Top length indent** is the taper in the length of the wheel stop, e.g. if the base length is 1.5m and the length at the top is 1.4m then the top length indent is 0.05m.
8. The **Offset from end of bay** is the distance from the centre of the wheel stop to the end of the bay.
9. The **Offset from side of bay** is the distance from the centre of the wheel stop to the bay side line on the driver's side.
10. Tick **Place in centre of bay** to position the wheel stop in the middle of the bay width.
11. Click the **Line Style** button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).

## Parking Standard: Construction Lines (4490)

Construction lines are generally used only in setting out the parking area and then switched off.

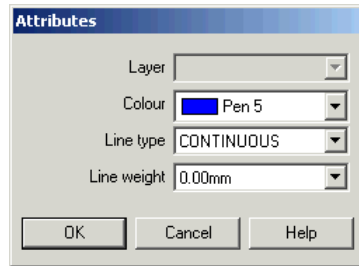
1. Click on the **Construction Lines** tab.



Parking Standard: Construction Lines tab

2. Tick **Row baseline** to show the baseline construction line. Click the Attributes button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).
3. Tick **Car park island kerb boundary** to show guidelines at the outer face of the start and island. Click the Attributes button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).
4. Tick **Flow direction arrows** to show arrows in the aisles indicating the direction of vehicle movement. Click the Attributes button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).
5. Tick **Aisle clearance zone** to show a line representing the minimum distance from the bay entrance lines to the nearest obstruction. Click the Attributes button to modify the **Colour**, **Line type** and **Line weight** in the [Attributes dialog](#).

## Attributes dialog



Attributes dialog

1. Select the **Colour** from the drop down list of 254 pens. To set a custom colour select {custom} and click on the colour swatch.
2. Select the **Line type** from the drop down list. The line types listed are those currently available in your CAD system. If you wish to add a line type you should cancel this dialog and create the line type in your host CAD system.
3. Select the **Line weight** from the drop down list. Note that line weights are real world dimensions so if you select a line weight of 2mm the object will be drawn with 2mm thick lines.





# Junctions: Creating and editing junctions

AutoTrack Junctions can model roundabouts according to defined standards. Terminology varies around the world but in UK terms, Junctions can model normal and compact roundabouts.

AutoTrack creates roundabouts that blend with existing or planned roads. The point on each incoming road, or arm, at which the roundabout model starts is called the blend point. So, if you have four roads leading into your roundabout you will have four blend points.

Once placed, every aspect of your roundabout model, including the location of the blend points, can be edited using either grips or using the properties dialog.

The default geometry of your roundabout is determined by the junction standard that you select. The standards that we supply are locked to prevent accidental (or intentional) changes but you can create your own and these can be password protected.

The junction standard defines limits for each geometric value. Values may also be unlimited. As you adjust your roundabout model, AutoTrack checks the geometry against these limits and displays an immediate warning if a value goes outside the specified range. These warnings are also used by the Audit tool and here you are able to enter a justification for the transgression.

The appearance of the roundabout, line colours, styles, thicknesses, etc is controlled by styles. A single style comprises the attributes of all the elements of the roundabout model such as kerbs, pedestrian crossings and so on.

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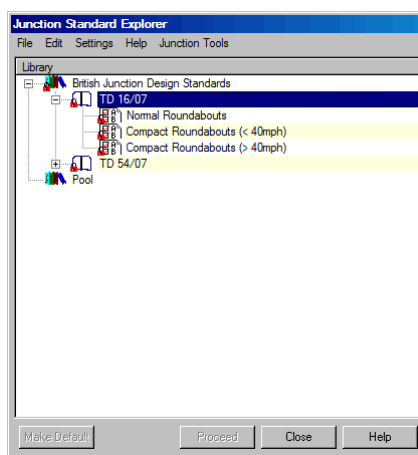
## Placing a new roundabout (8400)

In order to define a roundabout you will first need to identify the alignments of the arms (the incoming roads). If they don't already exist, draw accurate centrelines of each arm extending to at least to the point where the new roundabout will join any existing road (the blend point). Now...



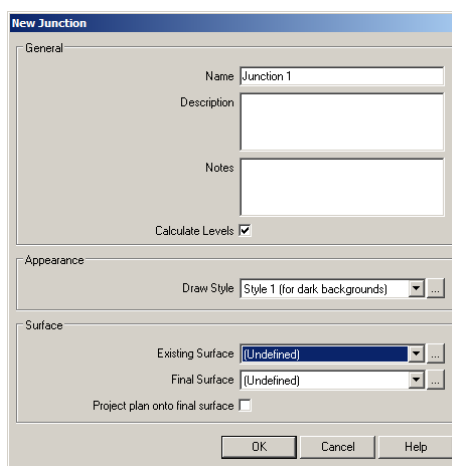
*New Roundabout button*

1. Click the **New Roundabout** button on the Junctions toolbar or select **New Roundabout** from the Junctions drop down menu. If you don't have a default standard set, the Junction Standard Explorer will appear.



Junction Standard Explorer

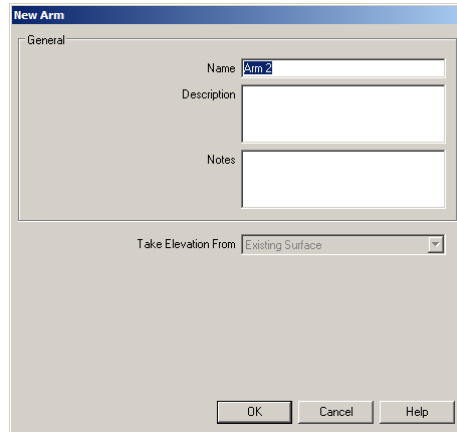
2. Click on the + to expand the tree view and display the required standard file and group. When you find the required standard, highlight it and click **Proceed**.
3. Depending upon the way your copy of Junctions is configured, the Scale Settings dialog may appear at this point. If so, check that you are using the correct scale and units and that the driving convention is correct and then click **OK**. The Junction Properties dialog will appear.



Junction Properties dialog

4. If you wish, at this point, you can enter a **Name** for the roundabout as well as **Notes** and/or a **Description**. You can do this later if you prefer.
5. You can also choose a **Draw Style** from the drop down list. This controls how the roundabout appears.
6. If you are running AutoCAD Civil 3D 2010 or later, you may select an **Existing Surface** and a **Final Surface** on which you may project the roundabout.

7. Click **OK** to proceed. A default roundabout will appear at the cursor.
8. Move the roundabout to the required location and left click to confirm. You may use snap modes to get a precise location.
9. The roundabout will be drawn in its final location and you will now be prompted to select the first of the arms. Select the arm roughly where you expect it to blend with any existing road. The New Arm dialog will appear.



New Arm dialog

10. Enter a **Name**, **Description** and/or **Notes** if you wish and click **OK**. The arm will appear with the blend point at the point you picked. However, the arm cannot be drawn if you pick too close to the roundabout so in this situation the arm will be extended by a suitable amount. You may subsequently move the blend point closer to the roundabout once you have finished placing the roundabout.

#### Tip

*If you are running in Civil 3D, we **strongly** recommend that you name the roundabout now so that the alignments are automatically created with the correct names. AutoTrack does not rename alignments if you change the roundabout name after creation.*

11. Repeat this process picking each arm and right click to terminate the New Roundabout command.

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## Adding and removing features

### Adding a road <sup>(8410)</sup>



New Road button

1. As with creating a new roundabout, to add a road to a roundabout you will need to be able to pick the alignment. Draw a polyline to represent the centreline of the road if one does not already exist.
2. Click the **New Road** button on the Junctions toolbar or select **New Road** from the Junctions drop down menu.
3. Select the junction to which you wish to add the road if not preselected.
4. Select the road centreline roughly at the point at which you anticipate it will join to the existing road. The New Arm dialog will appear.

A screenshot of the 'New Arm' dialog box. It has a title bar 'New Arm' with a close button. The 'General' tab is selected. It contains four text input fields: 'Direction', 'Name' (with 'Unnamed' in blue), 'Description', and 'Notes'. At the bottom are 'OK', 'Cancel', and 'Help' buttons.

New Arm dialog

5. Enter a **Name**, **Description** and/or **Notes** if you wish and click **OK**. The arm should appear.

#### Tip

*If you are running in Civil 3D, we **strongly** recommend that you name the arm now so that the alignments are created with the correct names. AutoTrack does not rename alignments if you change the roundabout arm names after creation.*

6. If the arm does not appear then you may have picked the alignment too close to the roundabout. Try again. If you still can't add the arm continue to the next one and add the arm after you have adjusted the alignment.

### Deleting a road



Delete Road button

1. Click the **Delete Road** button on the Junctions toolbar or select **Delete Road** from the Junctions drop down menu.
2. Move the cursor over the road that you want to delete and left click to confirm.
3. The road will be removed.

### Adding splitter islands

1. Click the **New Splitter Island** button on the Junctions toolbar or select **New Splitter Island** from the Junctions drop down menu.

2. Select the junction to which you wish to add the splitter island if not preselected.
3. Now simply move the cursor over the required splitter between the entry and exit lanes and click to confirm. A default sized splitter island will be drawn.
4. You will be left in 'add splitter island' mode so you may continue to add splitter islands to other arms if required. Right click when you have finished adding splitter islands.

## Deleting splitter islands

1. Click the **Delete Splitter Island** button on the Junctions toolbar or select **Delete Splitter Island** from the Junctions drop down menu.
2. Move the cursor over the island that you want to delete and left click to confirm.
3. The splitter island will be removed.
4. You will be left in 'delete splitter island' mode so you may continue to delete splitter islands to other arms if required. Right click when you have finished deleting splitter islands.

## Adding pedestrian crossings

1. Junctions supports various types of pedestrian crossings but they are all placed in the same way.
2. Click the **New Pedestrian Crossing** button on the Junctions toolbar or select **New Pedestrian Crossing** from the Junctions drop down menu.
3. Select the junction to which you wish to add the crossing if not preselected.
4. Now simply move the cursor over the required arm. If you have dimensions switched on whilst editing the distance of the crossing from the yield line will be display.
5. Click to confirm the crossing location. A default sized pedestrian crossing will be drawn.
6. You will be left in 'add crossing' mode so you may continue to add crossings to other arms if required. Right click when you have finished adding crossings.

## Deleting pedestrian crossings

1. Click the **Delete Pedestrian Crossing** button on the Junctions toolbar or select **Delete Pedestrian Crossing** from the Junctions drop down menu.
2. Move the cursor over the crossing that you want to delete and left click to confirm.
3. The crossing will be removed.
4. You will be left in 'delete crossing' mode so you may continue to delete crossings from other arms if required. Right click when you have finished deleting crossings.

## Adding rumble strips

Rumble strips are known by various names around the world but are basically a speed control device.

1. Click the **New Rumble Strips** button on the Junctions toolbar or select **New Rumble Strips** from the Junctions drop down menu.
2. Select the junction to which you wish to add the rumble strips if not preselected.
3. Now simply move the cursor over the required arm. If you have dimensions switched on whilst editing the distance of the start of the rumble strips from the yield line will be displayed.
4. Click to confirm the crossing location. Default rumble strips will be drawn.
5. You will be left in 'add rumble strips' mode so you may continue to add rumble strips to other arms if required. Right click when you have finished adding rumble strips.

## Deleting rumble strips

1. Click the **Delete Rumble Strips** button on the Junctions toolbar or select **Delete Rumble Strips** from the Junctions drop down menu.
2. Move the cursor over the rumble strips that you want to delete and left click to confirm.
3. The rumble strips will be removed.
4. You will be left in 'delete rumble strips' mode so you may continue to delete rumble strips from other arms if required. Right click when you have finished deleting rumble strips.

## Adding speed striping

Speed striping is another common speed control device which is known by many names.

1. Click the **New Speed Striping** button on the Junctions toolbar or select **New Speed Striping**
2. Select the junction to which you wish to add the speed striping if not preselected.
3. Now simply move the cursor over the required arm. If you have dimensions switched on whilst editing the distance of the start of the speed striping from the yield line will be displayed.
4. Click to confirm the striping location. Default speed striping will be drawn.
5. You will be left in 'add speed striping mode so you may continue to add speed striping to other arms if required. Right click when you have finished adding speed striping.

## Deleting speed striping

1. Click the **Delete Speed Striping** button on the Junctions toolbar or select **Delete Speed Striping** from the Junctions drop down menu.

2. Move the cursor over the striping that you want to delete and left click to confirm.
3. The speed striping will be removed.
4. You will be left in 'delete speed striping' mode so you may continue to delete speed striping from other arms if required. Right click when you have finished deleting speed striping.

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## Editing a junction

Junctions can be edited graphically or manually using the Junction Properties dialog. This allows you to change values precisely.

### Junction Properties dialog



*Edit Junction button*

1. Select the junction you want to edit.
2. Click the **Edit Junction** button on the Junctions toolbar or select **Edit Junction** from the Junctions drop down menu. The Junction Properties dialog will appear.

The Junction Properties dialog box for 'Junction 1'. It has a left-hand tree view and a right-hand detail pane. The tree view includes 'General', 'Preferences', 'Roundel', 'Arm 1 (West)', 'Arm 2 (East)', 'Arm 3 (North)', 'Arm 4 (South)', 'Fastest Path Analysis', 'Swept Path Analysis', 'ARCADY Analysis', 'Head Up Display', 'Visibility Analysis', and 'Signage'. The right-hand pane is titled 'Junction Properties Junction 1 (Dims: m, deg, sec, km/h)' and contains sections for 'General' (ID: 1, Junction Type: Roundabout, Name: Junction 1, Description, Notes, Standard Used: TD16/07: Compact Roundabouts (< 4), Kerb Offset: 0.0, 0.0, 5.0), 'Appearance' (Draw Style: Style 1 (for dark backgrounds)), and 'Surface' (Existing Surface: Undefined, Final Surface: Undefined, Project plan onto final surface: unchecked). At the bottom are buttons for 'Diagram', 'Apply', 'Close', and 'Help'.

Junction Properties: General

3. The Junction Properties dialog is modeless so you can leave it displayed while you continue working.
4. The left hand pane is a tree view list of the roundabout elements including the traffic circle and the arms. If only the General element is listed on the left then you did not select a junction; pick a junction now. Click + to expand the tree view.
5. The right hand pane lists the details of the selected element.
6. The Junction Properties Diagram is used to explain the terminology. Depress the **Diagram** button to display it and click again to hide it.
7. In many of the pages within the Junction Properties dialog you will see **Max** and **Min** columns. These refer to the limiting values recommended by the design standard that you have chosen to use. In many cases you will be permitted to exceed these values but they will appear as warnings on the drawing and as exceptions in an audit report.



## Junction Properties: General<sup>(8610)</sup>

1. Click **General** in the left hand pane. The General page will appear.

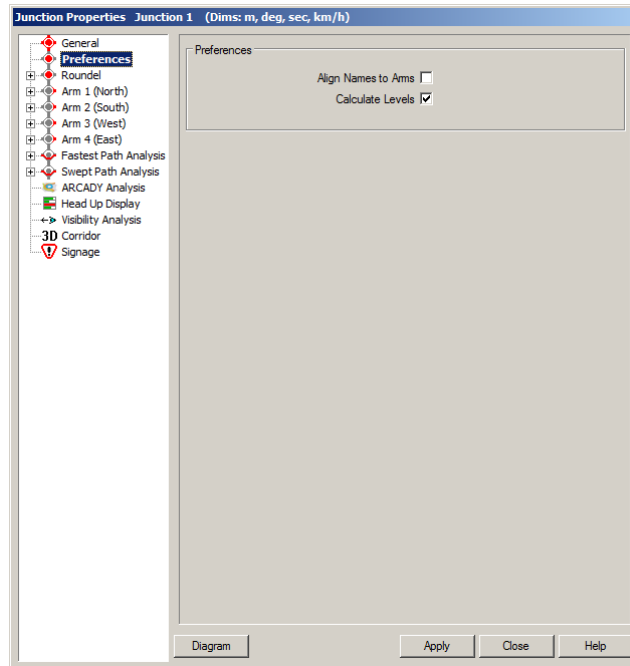
The screenshot shows the 'Junction Properties' dialog box for 'Junction 1'. The left pane lists various analysis tools, with 'General' selected. The main area is divided into sections: 'General' (ID: 1, Junction Type: Roundabout, Name: Junction 1, Description: , Notes: , Standard Used: TD16/07: Compact Roundabouts (< 4), Kerb Offset: 0.0, 0.0, 5.0), 'Appearance' (Draw Style: Style 1 (for dark backgrounds)), and 'Surface' (Existing Surface: Undefined, Final Surface: Undefined, Project plan onto final surface: unchecked). Buttons at the bottom include 'Diagram', 'Apply', 'Close', and 'Help'.

Junction Properties: General

2. The **Junction Type** is read-only and displays the type of junction that you are editing.
3. The junction **ID** is also read-only. The ID is used when junctions are listed in the Drawing Explorer.
4. Enter **Name**, **Description** and/or **Notes** as required.
5. The **Standard Used** contains the name of the controlling standard. That is, the standard that specifies the design limits. You may change the controlling standard by clicking on the adjacent ... button. Select the required new standard and click **OK**. None of the geometry will change but the new limits will be applied and may cause additional warnings to be displayed.
6. The junction is set out using definition lines. The **Kerb Offset** is the distance from the definition line to the kerb. A positive distance means that the kerb is further from the centre of the roundabout than the definition line. The kerb offset applies to the outer roundabout kerb and all kerbs that merge with it.
7. The **Draw Style** determines how the junction will appear. To change to a different style select the required style from the drop down list box. To view at or edit the current style click the ... button. The Edit Drawing Style dialog will appear (see [Drawing Settings: Styles: Drawing Style<sup>\(2330\)</sup>](#)).

## Junction Properties: Preferences <sup>(8615)</sup>

1. Click **Preferences** in the left hand pane. The Preference page will appear.

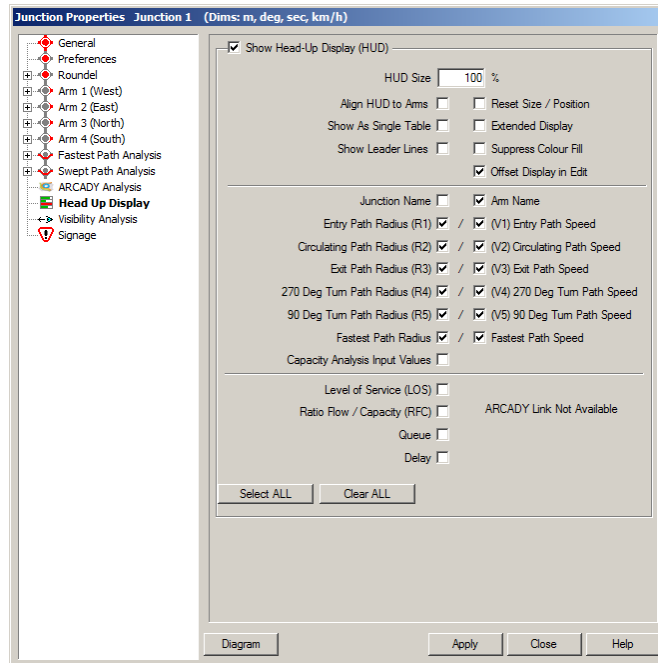


Junction Properties: Preferences

2. Tick **Align Names to Arms** to display the arm names at the approach road alignment. If left unchecked the names will be displayed horizontally.
3. Tick **Calculate Levels** to have AutoTrack use the specified crossfalls and levels to calculate levels throughout the roundabout. Note that AutoTrack can calculate levels even if you are not working in a 3D CAD system.

## Junction Properties: Head Up Display <sup>(8617)</sup>

1. Click **Head Up Display** in the left hand pane. The Head Up Display page will appear.



Junction Properties: Head Up Display

2. Tick **Show Head-Up Display (HUD)** to enable the display of selected design and analysis values on each roundabout entry point or as a table.

### Tip

*The grip at the bottom left of each HUD allows you to adjust the HUD position relative to the arm but note that individual HUD's (i.e. not a single table HUD) will still move as the arm alignments change.*

3. You can set the global **HUD Size** as a percentage of the default (100%) size. This affects all HUD's.

### Tip

*The grip at the top right of each HUD allows you to adjust the size of an individual HUD. This lets you highlight particular values.*

4. Tick **Align HUD to Arms** to display the head-up display at the entry arm alignment. If you leave this unchecked the head-up displays will be displayed horizontally.
5. Tick **Reset Size / Position** to set the size and location of the HUD's back to the defaults.
6. Tick **Show As Single Table** to display the HUD's for all arms in a single table. In this mode the angle of the HUD is always horizontal.
7. Tick **Extended Display** to display arrows at the right hand side of the HUD on values that exceed the maximum. The number of arrows displayed represents the degree by which the value exceeds the maximum, one arrow for a value that is between 0

and 100% greater than the maximum, two arrows for a value that is between 100% and 200% greater than the maximum, and so on up to five arrows.

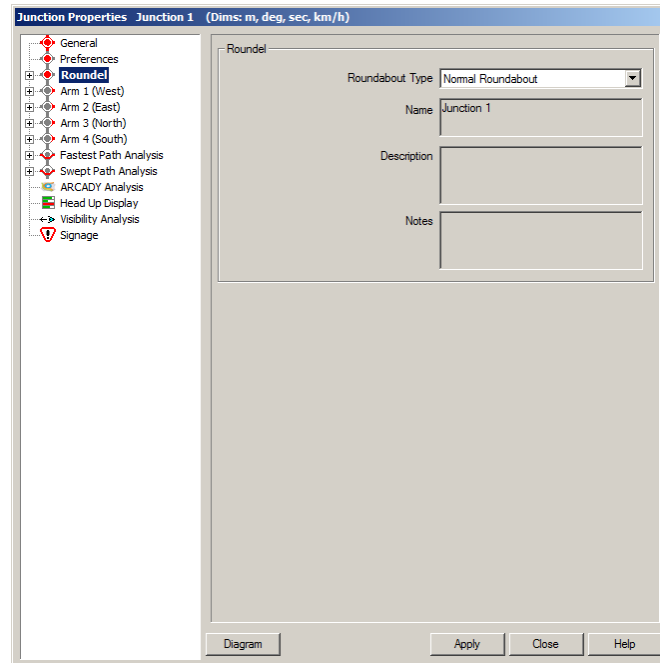
8. Tick **Show Leader Lines** to display lines connecting each HUD to the corresponding arm.
9. By default the values are all scaled and displayed in a colour that depends upon the value. The values calculated by AutoTrack are generally red if the value is outside the max/min limits of the standard, amber if it is close to a limiting value and green otherwise. ARCADY values are coloured to match those used in ARCADY for consistency. If you wish to disable this colour coding, tick **Suppress Colour Fill**.
10. By default **Offset Display in Edit** is ticked. This means that when you edit a roundabout the new values are displayed in a HUD alongside the existing values rather than over the top. This generally makes it easier to read the values and interpret the effect of the change. If you would rather the new values were displayed over the existing values then untick **Offset Display in Edit**.
11. The remainder of the dialog lists values that may be selected for display. Tick those that you wish to see.

**Note**

*The ARCADY analysis values will only be displayed if the link is active.*

## Junction Properties: Roundel (8620)

1. Click **Roundel** in the left hand pane. The Roundel page will appear.



Junction Properties: Roundel

2. The position of the roundabout is shown in the **Location** field. This is shown here for convenience and may be edited on the Central Island page.
3. Enter a **Name**, **Description** and/or **Notes** for the roundabout (as opposed to the connecting roads).
4. Click the + symbol to expand the Roundel element.

## Junction Properties: Roundel: Central Island (8630)

1. Expand Roundel and click **Roundel** in the left hand pane. The Roundel page will appear.

**Junction Properties - Junction 1** (Dims: m, deg, sec, km/h)

**Left Pane (Tree View):**

- General
- Preferences
- Roundel
  - Central Island** (Selected)
  - Circulatory Lanes
  - Crown Lines
  - Levels & Grades
  - Arm 1 (West)
  - Arm 2 (East)
  - Arm 3 (North)
  - Arm 4 (South)
- Fastest Path Analysis
- Swept Path Analysis
- ARCADY Analysis
- Head Up Display
- Visibility Analysis
- Signage

**Right Pane (Island Tab):**

Location: 53.581932, 20.552085

	Value	Min	Max
Inscribed Circle Diameter	36.0	28.0	36.0
Centre Island Diameter	16.0	4.0	32.0
Apron Diameter	18.0	4.0	30.0
Apron Width	1.0	0.0	20.0

Buttons: Diagram, Apply, Close, Help

Junction Properties: Roundel: Central Island

2. We anticipate that users will generally position their roundabout using the mouse since. However if you'd rather enter coordinates manually use the **Location** field.
3. The **Inscribed Circle Diameter** is the diameter of the definition line that represents the outer limit of the roundabout. Note that if a kerb offset has been defined then the actual kerb will not coincide with the definition line.
4. The **Centre Island Diameter** is the diameter of the island around which the vehicles turn. It does NOT include the apron or overrun area.
5. The **Apron Diameter** is the diameter of the overrun area.

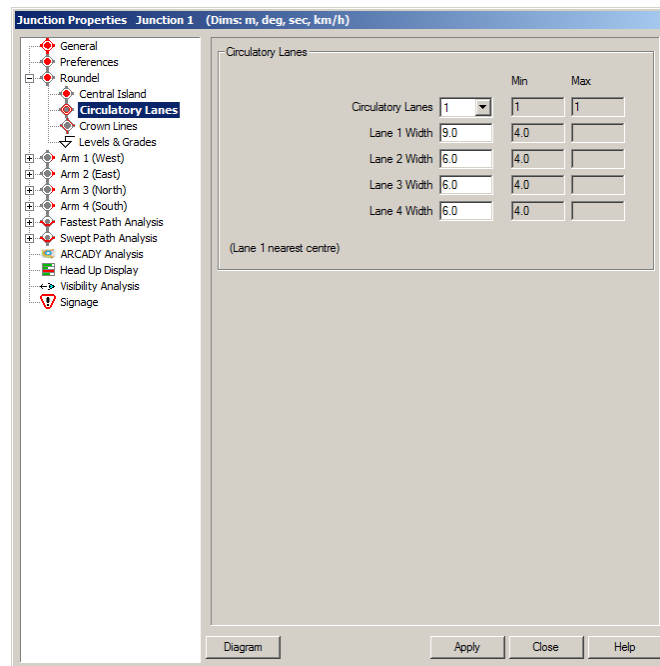
### Note

*The apron is regarded as falling outside the central island.*

6. The apron is often specified as a width so **Apron Width** just give you an alternative way to enter its size.
7. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.

## Junction Properties: Roundel: Circulatory Lanes (8640)

1. Expand Roundel and click **Circulatory Lanes** in the left hand pane. The Circulatory Lanes page will appear.

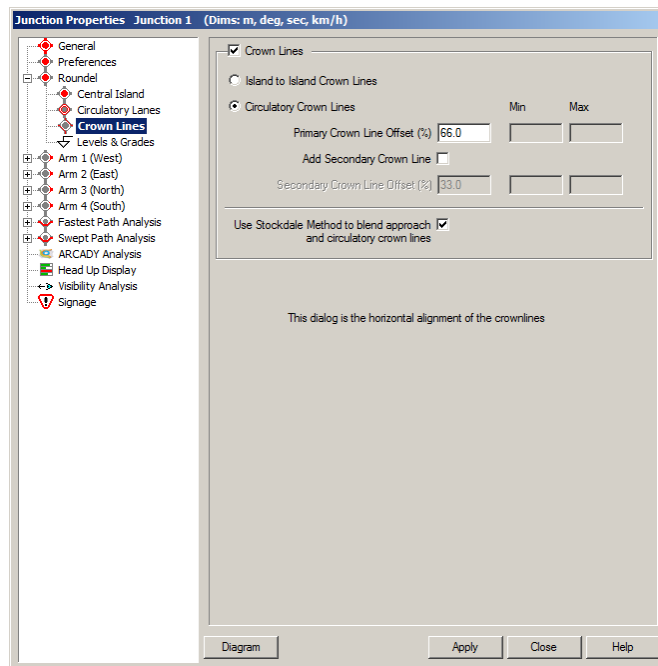


Junction Properties: Roundel: Circulatory Lanes

2. Select the number of **Circulatory Lanes** from the drop down list.
3. Enter **Lane Width** for up to four lanes.
4. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.

## Junction Properties: Roundel: Crown Lines (8645)

1. Expand Roundel and click **Crown Lines** in the left hand pane.



Junction Properties: Roundel: Crown Lines

2. Tick **Crown Lines** to calculate crown lines. Note that the approach crown lines will not be calculated unless this is ticked.
3. Select the required crown line type.

**Island to Island Crown Lines** are straight crown lines from each entry splitter line / ICD intersect point with the next exit splitter line / ICD intersect point.

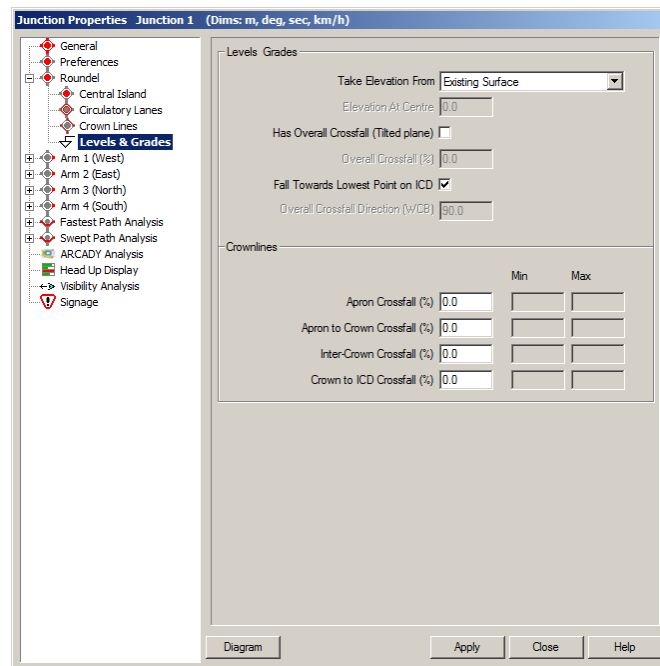
**Circulatory Crown Lines** are circular crown lines concentric with the ICD. In some cases there may be two circulatory crown lines.

4. The **Primary Crown Line Offset** is measured from the ICD and is expressed as a percentage of the circulatory width. Thus 0% would place a crown line on the ICD and 100% would place it at the centre island.
5. If you require a second circulatory crown line then tick **Add Secondary Crown Line** and enter the **Secondary Crown Line Offset** which is measured exactly as the first.
6. Currently there is only one method available to draw the approach crown lines and blend them to the circulatory crown lines, the Stockdale Method. Tick **Use Stockdale Method...** to use this option. If you untick **Use Stockdale Method...** then only the crown lines in the circulatory area will be drawn because we have no way to calculate the interface of the approach lines and the circulatory lines.
7. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.



## Junction Properties: Roundel: Levels & Grades (8642)

1. Expand Roundel and click **Levels & Grades** in the left hand pane. The Levels & Grades page will appear.

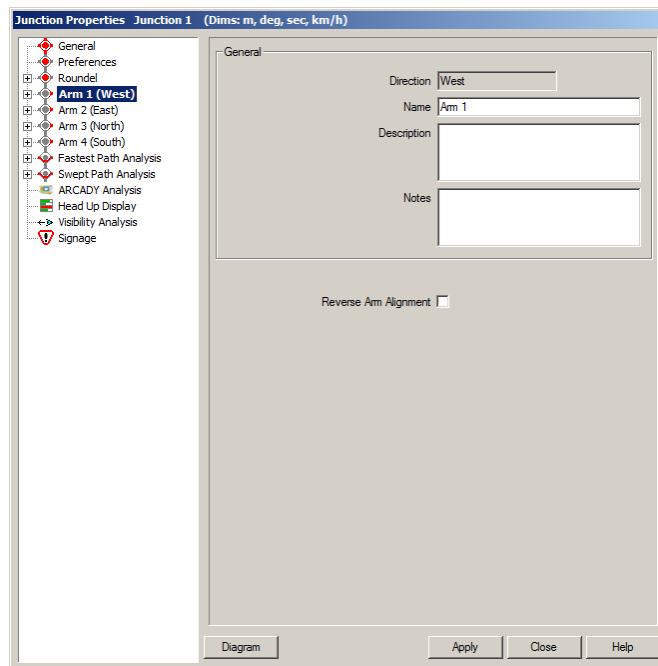


Junction Properties: Roundel: Levels & Grades

2. By default the roundabout **Elevation** is set to **Existing Surface** as defined on the General tab. To specify a fixed level for the roundabout select **User-Defined Elevation** and enter the **Elevation at Centre**.
3. It is good practice to build roundabouts with an overall crossfall, i.e. on a tilted plane. Tick **Has Overall Crossfall** to build the roundabout on a tilted plane and enter the crossfall, as a percentage, in **Overall Crossfall**.
4. By default AutoTrack will create crossfall towards the lowest point on the existing surface at the ICD. To specify a different crossfall direction, untick **Fall Towards Lowest Point on ICD** and enter the required direction, as a whole circle bearing, in **Overall Crossfall Direction**.
5. You may enter required crossfalls for the **Apron** and up to two circulatory crown lines, that is, the **Apron to Secondary Crown**, the **Primary to Secondary Crown** and the **Crown to ICD**. In all cases the slope is positive if it falls towards the ICD.
6. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.

## Junction Properties: Arm (8690)

1. Click **Arm** in the left hand pane. The Arm page will appear.



Junction Properties: Arm

2. The direction of the arm is shown in the **Direction** field. This is shown for convenience is determined automatically from the whole circle bearing of the arm.
3. Enter a **Name**, **Description** and/or **Notes** for the roundabout arm.
4. AutoTrack works out which end of each of the picked arm centrelines is closest to the centre of the roundabout and therefore the most logical direction of the road. If it gets it wrong, tick **Reverse Arm Alignment** to change it.
5. Click the + symbol to expand the Arm element.

## Junction Properties: Arm: Approach <sup>(8650)</sup>

1. Expand an arm and click **Approach** in the left hand pane. The Approach page will appear.

**Junction Properties - Junction 1** (Dims: m, deg, sec, km/h)

**Approach Road**

	Min	Max
Design Speed	48.28	64.374
Central Gap Width	0.0	
Centre Line Offset	0.29	

**Approaching:**

Lanes	0	1
Lane Width	3.5	4.0
Crown Line Blend Offset	0.0	
Crown Line Offset at Entry (%)	33.3	

**Departing:**

Lanes	0	1
Lane Width	3.5	4.0
Crown Line Blend Offset	0.0	
Crown Line Offset at Exit (%)	33.3	

Buttons: Diagram, Apply, Close, Help

Junction Properties: Arm: Approach

2. The **Central Gap Width** is the distance between the offside definition lines of the approaching lanes and the departing lanes.
3. The **Centreline Offset** is the distance from the projected arm alignment tangent at the ICD and the centre of the island. The offset is positive if the tangent passes the centre of the island on the opposite side to the entry road. Thus the larger the offset the larger the entry deflection and vice versa. This value can only be grip-edited and is displayed in this dialog in a read-only field.
4. Select the number of **Approaching Lanes** and **Departing Lanes** from the drop down list.
5. The **Approaching Lane Width** and **Departing Lane Width** are measured between definition lines. On a road with no centre gap the offside definition line is the centreline.
6. The **Crown Line Blend Offset** is the point at which the entry and exit crown lines merge with the arm centreline and is measured along the alignment from the intersection with the ICD.
7. The entry and exit **Crown Line Entry Offset** is the lateral offset of the crown lines at entry (or exit) measured from the nearside kerb as a percentage of the width.
8. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.

## Junction Properties: Arm: Entry <sup>(8670)</sup>

1. Expand an arm and click **Entry** in the left hand pane. The Entry page will appear.

**Junction Properties - Junction 1** (Dims: m, deg, sec, km/h)

☒ Entry

	Min	Max
Design Speed	48.28	64.374
Number of Lanes	1	1
Lane Width	3.0	4.5
Splitter Radius	0.0	100.0
Nearside Radius	10.0	70.0
Inter-Arm Radius	0.0	100.0
Additional Lane Length	0.0	200.0
Taper Lane Length	5.0	100.0
Flare Lane Width	2.5	3.5

☐ Equal Spacing Between Lanes  
☐ Longer Inner Lane Line  
☐ Straight Yield Line  
☐ Ignore in Capacity Calculations (e.g. service road)

Diagram Apply Close Help

Junction Properties: Arm: Entry

2. Select the **Number of Lanes** from the drop down list.
3. The **Lane Width** is measured between centres of lane markings. The innermost and outermost lane widths are measured to the nearside and offside definition lines respectively.
4. The **Splitter Radius** is the radius of the offside definition line at the splitter.
5. The **Nearside Radius** is the radius of the nearside definition line at the splitter.
6. The **Inter-Arm radius** is the radius between the current arm and the next arm. Note that this is used to connect the nearside definition lines of two adjacent arms if the lines do not intersect on the Inscribed Circle.
7. The **Additional Lane Length** is measured from the yield line where it intersects the splitter line.
8. The **Taper Lane Length** is the distance over which the entry road width changes as it adjusts to accommodate the additional lane. This is normally a significant positive value to avoid a severe step in the nearside definition line.
9. The **Minimum Flare Lane Width** is the minimum width of any marked lane.
10. Tick **Equal Spacing Between Lanes** to even out the lane width.
11. By default an additional lane at entry is added at the nearside and the offside approach lanes are extended to the yield line. If you wish the additional lane to be added to the offside then tick **Add Lane to Offside**.

12. If this exit is not relevant to flow calculations, e.g. it might be a service road, then tick **Ignore in Capacity Calculations**.
13. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.

## Junction Properties: Arm: Exit <sup>(8680)</sup>

1. Expand an arm and click **Exit** in the left hand pane. The Exit page will appear.

**Junction Properties - Junction 1** (Dims: m, deg, sec, km/h)

**Exit**

	Value	Min	Max
Design Speed	48.28	48.28	64.374
Number of Lanes	1	0	1
Lane Width	4.5	3.0	4.5
Splitter Radius	100.0	0.0	100.0
Nearside Radius	20.0	15.0	20.0

☐ Equal Spacing Between Lanes  
☐ Longer Inner Lane Line  
☐ Ignore in Capacity Calculations (e.g. service road)

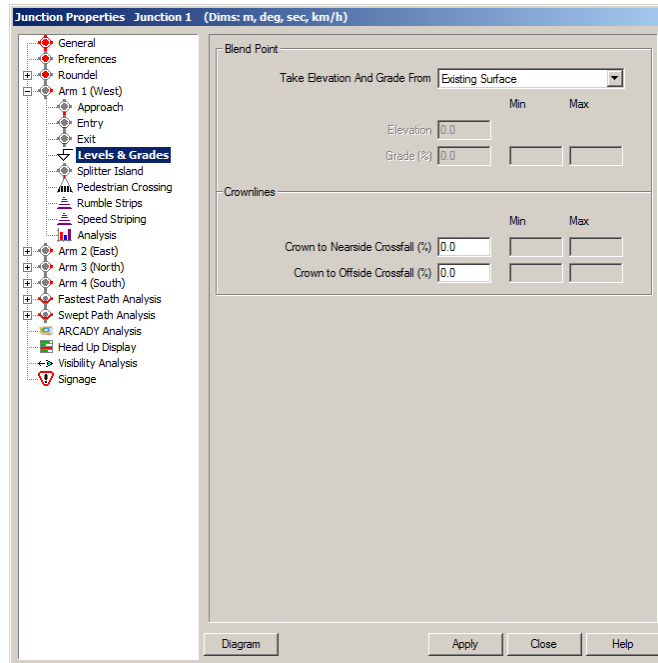
Diagram Apply Close Help

Junction Properties: Arm: Exit

2. Select the **Number of Lanes** from the drop down list.
3. The **Lane Width** is measured between centres of lane markings. The innermost and outermost lane widths are measured to the nearside and offside definition lines respectively.
4. The **Splitter Radius** is the radius of the offside definition line at the splitter.
5. The **Nearside Radius** is the radius of the nearside definition line at the splitter.
6. Tick **Equal Spacing Between Lanes** to even out the lane width.
7. By default an additional lane at entry is added at the nearside and the offside approach lanes are extended to the yield line. If you wish the additional lane to be added to the offside then tick **Add Lane to Offside**.
8. If this exit is not relevant to flow calculations, e.g. it might be a service road, then tick **Ignore in Capacity Calculations**.
9. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.

## Junction Properties: Arm: Levels & Grades <sup>(8695)</sup>

1. Expand an arm and click **Levels** in the left hand pane. The levels page will appear.



Junction Properties: Arm: Levels & Grades

2. By default AutoTrack will take the arm elevation and longitudinal gradient at the Deviation Point from the existing surface. To specify a different level or gradient, untick **Elevation and Grade from Existing Surface** and enter the required values in **Elevation** and **Grade**. Grade is measured towards the roundabout and a positive gradient is increasing level.
3. The arm will typically have a crown line and crossfalls to the nearside and offside. Enter these values as percentages in **Crown to Nearside** and **Crown to Offside**.
4. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.

## Junction Properties: Arm: Splitter Island (8730)

The splitter island is distinct from the splitter. The splitter is formed by the triangle of entry, exit and roundabout definition lines and is normally marked on the road. A splitter island typically has a kerbed edge and may or may not have pedestrian access and/or a refuge. In some cases splitter islands are mandatory, in others they are discretionary.

1. Expand an arm and click **Splitter Island** in the left hand pane. The Splitter Island page will appear.

The screenshot shows the 'Junction Properties' dialog box for 'Junction 1' (Units: m, deg, sec, km/h). The left pane shows a tree view with 'Splitter Island' selected under 'Arm 1 (West)'. The right pane shows the 'Splitter Island' settings. The 'Splitter Island' checkbox is checked. The 'Island Length' field is empty, with 'Min' and 'Max' columns. The 'Entry Kerb Line' section has 'Curved' checked, 'Kerb Radius' set to 'Tracking', and 'Inner Offset' and 'Outer Offset' set to 0.3. The 'Exit Kerb Line' section has 'Curved' checked, 'Kerb Radius' set to 'Tracking', and 'Inner Offset' and 'Outer Offset' set to 0.3. The 'Roundabout Kerb Line' section has 'Curved' unchecked, 'Kerb Radius' set to 'Tracking', and 'Entry Offset' and 'Exit Offset' set to 0.3. The 'Fillet Radii' section has 'Entry Fillet Radius', 'Exit Fillet Radius', and 'Approach Fillet Radius' all set to 0.5. At the bottom are 'Diagram', 'Apply', 'Close', and 'Help' buttons.

Junction Properties: Arm: Splitter Island

2. The splitter island page is divided into three identical areas that relate to each of the three sides of the splitter island and a fourth that relates to the fillet radii.
3. To add or remove the splitter island use the **Splitter Island** checkbox.
4. The **Island Length** will typically be displayed in red, indicating that it has been calculated from the other geometry. If you set a fixed length that is shorter than the other geometry will allow, the island will be truncated. If you set a fixed length that is longer than the other geometry will allow, the island will be drawn as long as possible within the geometry.
5. Each of the three kerb lines may either be straight or curved. Tick **Curved** to specify a curved line. This will enable the Kerb Radius field.
6. The **Kerb Radius** is set by default to **Tracking**. This means that it is offset from the splitter definition line and that the offset changes linearly from the inner offset to the outer offset. If you wish to specify a fixed radius then enter a value.

### Note

*If the end offsets are equal then the kerb radius is a circular arc concentric with the splitter definition line.*



7. The **Inner Offset** is the distance by which the splitter island is offset from the splitter definition line at the end closest to the centre of the roundabout.
8. The **Outer Offset** is the distance by which the splitter island is offset from the splitter definition line at the end furthest from the centre of the roundabout.
9. The **Entry Offset** and **Exit Offset** on the Roundabout Kerb Line section are the distances by which the splitter island are offset from the inscribed circle at the entry and exit ends respectively.
10. The **Entry Fillet Radius** is the radius of the fillet at the intersection of the entry kerb line and the roundabout kerb line.
11. The **Exit Fillet Radius** is the radius of the fillet at the intersection of the exit kerb line and the roundabout kerb line.
12. The **Approach Fillet Radius** is the radius of the fillet at the intersection of the entry and exit kerb lines.

**Note**

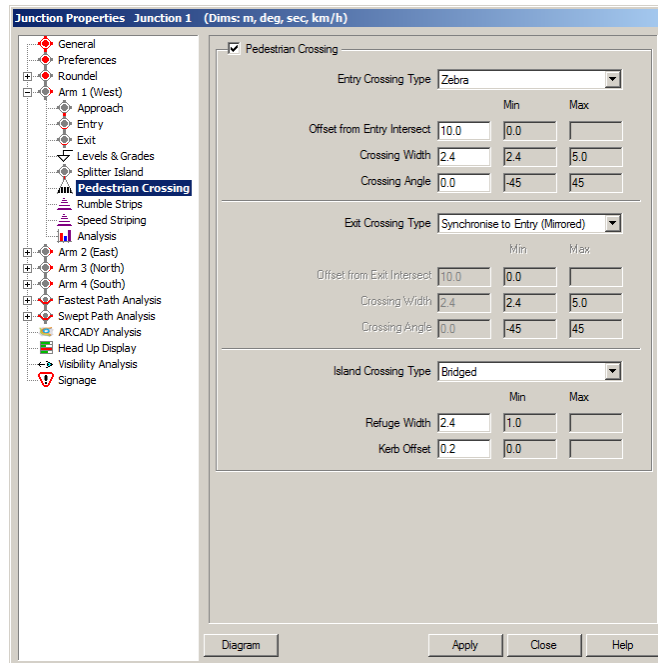
*If the approach road has a central gap and the sum of the outer offsets at entry and exit is less than the central gap width then the island approach fillet will be omitted and the splitter island kerb lines will be continued to form a central reservation.*

13. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.

## Junction Properties: Arm: Pedestrian Crossing (8660)

Pedestrian crossings are often located at roundabout entry/exit points because the traffic is moving slowest here.

1. Expand an arm and click **Pedestrian Crossing** in the left hand pane. The Pedestrian Crossing page will appear.



Junction Properties: Arm: Pedestrian Crossing

2. Use the **Pedestrian Crossing** checkbox to enable or disable a crossing.
3. The crossing page is divided into entry crossing, exit crossing and island crossing.
4. For each of the two lane crossing sections the **Crossing Type** may be set to Zebra, Pelican, Puffin, Toucan, Pegasus or None.
5. The **Offset from Entry Intersect** is measured along the offside (or splitter) definition line from the intersection of that line and the inscribed circle.
6. The **Entry Crossing Width** is measured perpendicular to the angle of the crossing.
7. The **Crossing Angle** is measured relative to a line perpendicular to the offside definition line. Rotation is positive when the crossing is turned away from the roundabout. In most cases the angle will be zero since this represents the shortest crossing distance.
8. You can link the entry and exit crossings by setting the **Exit Crossing Type** to **Synchronise to Entry (Mirrored)** or **Synchronise to Entry (Projected)**. In both cases the entry and exit crossing offsets change when you adjust the entry offset but the handling of the exit crossing angle varies slightly:-

If you select **Synchronise to Entry (Mirrored)**, the entry and exit crossing angles are identical relative to the normals to the entry

and exit splitter definition lines.

If you select **Synchronise to Entry (Projected)**, the entry crossing is projected in the same direction across the exit lanes.

**Note**

*In this mode the exit fields are disabled.*

9. The **Island Crossing Type** may be Projected, Bridged or Refuge.

A projected crossing has the entry and exit crossings extended until they meet.

A bridged crossing connects the entry and exit crossings at the point at which they intersect the splitter definition lines.

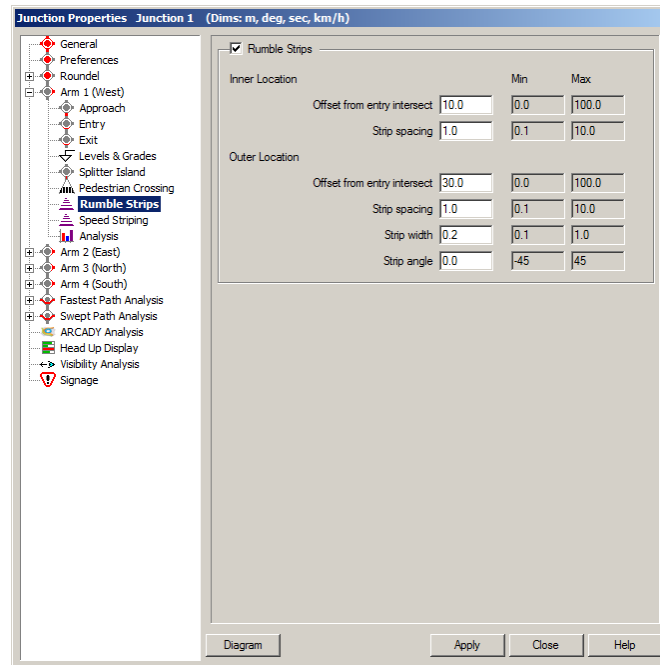
A crossing refuge has staggered entry and exit crossings. You can only set a crossing refuge if the entry and exit are not synchronised.

10. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.

## Junction Properties: Arm: Rumble Strips <sup>(8700)</sup>

Rumble strips are used to control vehicle speeds by making it uncomfortable to travel over them at significant speed. In addition travelling over rumble strips is noisy.

1. Expand an arm and click **Rumble Strips** in the left hand pane. The Rumble Strips page will appear.



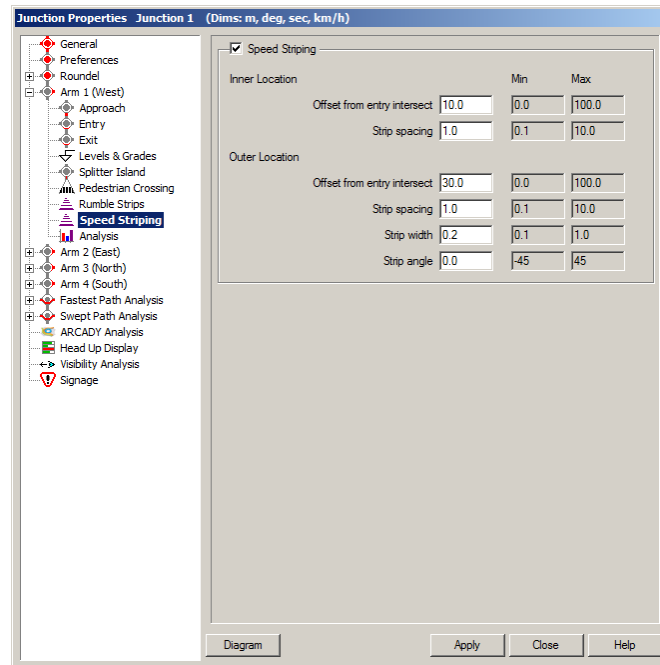
Junction Properties: Arm: Rumble Strips

2. Use the **Rumble Strips** checkbox to enable or disable the rumble strips.
3. Rumble strips start at the **Outer Offset from Entry Intersect** (furthest from the roundabout) and end closer to the roundabout at the **Inner Offset from Entry Intersect**. Both are measured along the offside (or splitter) definition line from the intersection of that line and the inscribed circle .
4. The **Outer Strip Spacing** is generally wider than the **Inner Strip Spacing**.
5. The **Strip Width** is measured perpendicular to the strip and does not vary.
6. The **Strip Angle** is measured relative to a line perpendicular to the offside definition line. Rotation is positive when the strips are turned away from the roundabout.
7. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.

## Junction Properties: Arm: Speed Striping <sup>(8710)</sup>

Speed striping is used to control vehicle speeds. They work very like rumble strips except that the emphasis is on a visual deterrent rather than an audible and physical one.

1. Expand an arm and click **Speed Striping** in the left hand pane. The Speed Striping page will appear.



Junction Properties: Arm: Speed Striping

2. Use the **Speed Striping** checkbox to enable or disable the speed striping.
3. Speed strips start at the **Outer Offset from Entry Intersect** (furthest from the roundabout) and end closer to the roundabout at the **Inner Offset from Entry Intersect**. Both are measured along the offside (or splitter) definition line from the intersection of that line and the inscribed circle.
4. The **Outer Strip Spacing** is often wider than the **Inner Strip Spacing**.
5. The **Strip Width** is measured perpendicular to the strip and does not vary.
6. The **Strip Angle** is measured relative to the normal to the offside definition line. Rotation is positive when the strips are turned away from the roundabout.
7. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.

## Junction Properties: Arm: Analysis (8780)

If you have ARCADY then you can benefit from the automatic 2-way transfer of data between it and Junctions. If not then this page displays the essential values necessary to perform the flow/capacity calculations, either by hand or using an alternative program. The values are calculated and updated continuously.

1. Click **Analysis** in the left hand pane. The Analysis page will appear.

The screenshot shows the 'Junction Properties: Junction 1' dialog box with the 'Analysis' tab selected. The left pane lists various junction components, with 'Analysis' highlighted. The right pane contains the following fields:

Capacity Analysis Input Values		
Entry Width	6.03 m	E
Entry Angle	27.65 deg	PHI
Approach Half Width	3.5 m	V
Effective Flare Length	7.42 m	L'
Entry Radius	39.99 m	R
Inscribed Circle Diameter	36.0 m	D
Exit Only	FALSE	
Fastest Line Speed	31.94	

Note: See caption bar for units except where noted

Entry Angle Measurement: (Automatic) Currently: The angle between entry and median circulatory paths

Buttons: Diagram, Apply, Close, Help

Junction Properties: Arm: Analysis

2. The values are all defined in the glossary.
3. By default the **Entry Angle** is automatically calculated in one of two ways depending upon the geometry of the roundabout. The method used is displayed in the **Entry Angle Measurement** drop-down list box. This also allows you to force the method in the event that you disagree with the method used.

### Note

*A manually selected method of entry angle measurement will only be used in preference to the method chosen by AutoTrack in the event that there are two alternative interpretations.*

## Junction Properties: Fastest Path Analysis: Fastest Path Calculation <sup>(8770)</sup>

One of the factors used to assess the safety of a roundabout is the maximum realistic speed of a notional vehicle on the most direct line (the fastest line) through the roundabout. This is known as the fastest line speed. To calculate the fastest line speed, Junctions first calculates the required alignment and then steps along it testing for the smallest radius. The smaller the radius, the slower the speed. The speed is calculated using the following equation which is taken from the AASHTO document 'A Policy on Geometric Design of Highways and Streets':-

$$1. \quad v^2 = 127R(e+f)$$

Where:-

**R** is Turn Radius (m)

**v** is Speed (km/h)

**e** is Super-elevation (assumed to be 0.0)

**f** is Side Friction Factor (adjusted for speed)

- Expand Fastest Path Analysis and click **Fastest Path Calculation** in the left hand pane. The Fastest Path Calculation page will appear.

	Value	Min	Max
Start Distance From Yield Line	50.0	50.0	50.0
Start Centreline Offset	1.0	1.0	
Entry Offset	1.0	1.0	
Island Offset	1.0	1.0	
Exit Offset	1.0	1.0	
End Centreline Offset	1.0	1.0	
End Distance From Exit Line	50.0	50.0	50.0
Radius Calculation Length	25.0	25.0	25.0
Offset Path From	Apron / Kerb Lines		

Junction Properties: Fastest Path Analysis: Fastest Path Calculation

- The method by which the fastest line is calculated varies and differing methods often give different answers. The settings on this page let you adjust how the calculation is done.
- The following offsets may be measured from definition lines or kerb lines and from island or apron. Use the **Offset Path From** drop down list to select the required method.

### Note

*In some parts of the world (notably the USA) the apron is*

*considered to be a part of the centre island. In these cases the fastest path would normally be offset from the centre island and not the apron. In other areas where the apron is considered to be outside the island, the fastest path would normally be offset from the apron and not the centre island.*

5. The **Start Distance from Yield Line** is the straight line distance from the inscribed circle to the front axle of the test vehicle.
6. The **Start Centreline Offset** is the minimum offset from the nearside or offside kerbs or definition lines.
7. The **Entry Offset** is the minimum offset of the centreline of the vehicle from the nearside entry kerb or definition line.
8. The **Island Offset** is the minimum offset of the centreline of the vehicle from the island or apron.
9. The **Exit Offset** is the minimum offset of the centreline of the vehicle from the nearside exit kerb or definition line.
10. The **End Centreline Offset** is the minimum offset from the nearside or offside kerbs or definition lines.
11. The **End Distance from Yield Line** is the straight line distance from the inscribed circle to the front axle of the test vehicle.
12. The **Radius Calculation Length** is the length over which the radius should be tested. Junctions calculates the radius of a 3-point arc of this length along the fastest line using the start, middle and end points.
13. The fastest line and speed are calculated continuously and optionally displayed in the HUD or Junction Report.
14. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.



## Junction Properties: Fastest Path Analysis: Vehicle Paths <sup>(8790)</sup>

The roundabout must be capable of accommodating appropriate vehicles. This tab allows the user to define up to five design vehicles.

1. Expand Fastest Path Analysis and click **Vehicle Paths** in the left hand pane. The Vehicle Paths page will appear.

	Warn %	Min	Max
Entry Path Radius (R1)	0		70.0
Circulating Path Radius (R2)	0		
Exit Path Radius (R3)	0		
270 Deg Turn Path Radius (R4)	0		
90 Deg Turn Path Radius (R5)	0		
Fastest Path Radius	0		

	Warn %	Min	Max
Entry Path Speed (V1)	0		112.654
Circulating Path Speed (V2)	0		112.654
Exit Path Speed (V3)	0		112.654
270 Deg Turn Path Speed (V4)	0		112.654
90 Deg Turn Path Speed (V5)	0		112.654
Fastest Path Speed	0		

Junction Properties: Fastest Path Analysis: Vehicle Paths

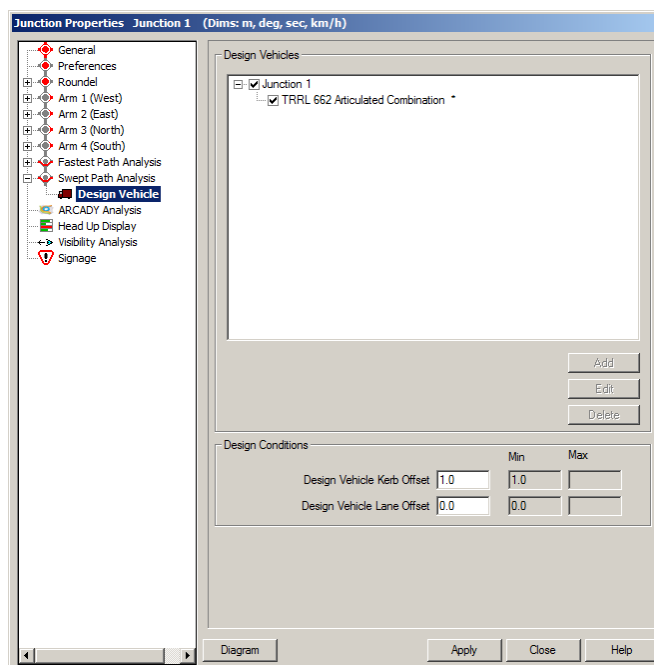
2. The **Vehicle Path Radii** frame displays the limiting radii at critical points on the roundabout and lets you define proximity warnings. As soon as the value in the HUD gets to within **Warn %** of the limiting value (max or min) it is displayed in orange. When it is less than the **Min** value or greater than the **Max** value it is displayed in red.
3. The **Entry Path Radius** is the radius of the path taken by the centre of the front axle of the vehicle at entry to the roundabout, i.e. at or about the yield line.
4. The **Circulating Path Radius** is the radius of the nominally through path as it negotiates the centre island.
5. The **Exit Path Radius** is the radius of the path taken by the centre of the front axle of the vehicle at exit from the roundabout, i.e. at or about the exit line.
6. The **270 Degree Turn Path Radius** is the radius of the path taken by the front axle of the vehicle as it performs a 270 degree turn. In fact this value is calculated for turn angle between 255 and 285 degrees.
7. The **90 Degree Turn Path Radius** is the radius of the path taken by the front axle of the vehicle as it performs a 90 degree turn. In fact this value is calculated for turn angle between 45 and 135 degrees.
8. The **Fastest Path Radius** is the minimum radius on the fastest path through the roundabout.

9. The **Vehicle Path Speeds** frame displays the limiting speeds at critical points on the roundabout and lets you define proximity warnings. As with the radii, as soon as the value in the HUD gets to within **Warn %** of the limiting value (max or min) it is displayed in orange.
10. The **Entry Path Speed** is the speed that equates to the radius of the path taken by the centre of the front axle of the vehicle at entry to the roundabout, i.e. at or about the yield line.
11. The **Circulating Path Speed** is the speed that equates to the radius of the nominally through path as it negotiates the centre island.
12. The **Exit Path Speed** is the speed that equates to the radius of the path taken by the centre of the front axle of the vehicle at exit from the roundabout, i.e. at or about the exit line.
13. The **270 Degree Turn Path Speed** is the speed that equates to the radius of the path taken by the front axle of the vehicle as it performs a 270 degree turn. In fact this value is calculated for turn angle between 255 and 285 degrees.
14. The **90 Degree Turn Path Speed** is the speed that equates to the radius of the path taken by the front axle of the vehicle as it performs a 90 degree turn. In fact this value is calculated for turn angle between 45 and 135 degrees.
15. The **Fastest Path Speed** is the speed that equates to the minimum radius on the fastest path through the roundabout.
16. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.

## Junction Properties: Swept Path Analysis: Design Vehicles <sup>(8793)</sup>

The roundabout must be capable of accommodating appropriate vehicles. This tab allows the user to manage the usage of design vehicles and/or to add new design vehicles.

1. Expand **Swept Path Analysis** and click **Design Vehicles** in the left hand pane. The Design Vehicles page will appear.



Junction Properties: Swept Path Analysis: Design Vehicles

2. The **Design Vehicles** frame lists vehicles that are defined in the standard along with any others that have been created.
3. Tick the vehicles you wish to include in the swept path analysis and untick those that you wish to omit.

### Note

*Design vehicles that are specified in the standard are regarded as mandatory and so omitting them from the analysis list will generate an audit warning.*

4. To add a vehicle to be analysed click **New**. The Design Vehicle dialog will appear. (See [Junction Properties: Swept Path Analysis: Design Vehicle <sup>\(8797\)</sup>](#))
5. Vehicles that have been created in the Junction Properties dialog may be edited but those defined in the standard may only be viewed. In either case highlight the vehicle and click **Edit** or **View**. The Design Vehicle dialog will appear. (See [Junction Properties: Swept Path Analysis: Design Vehicle <sup>\(8797\)</sup>](#))
6. The **Design Criteria** frame lets you specify the offsets from kerb and lane markings.
7. The **Vehicle Path Clearance** is the minimum distance between the inscribed circle kerb and the outer body envelope of the design vehicle turning in steady state around the roundabout.

**Note**

*This value is used by Junctions, in conjunction with the design vehicle critical dimensions, solely to calculate the minimum circulatory width required. It is not used to limit the placement of actual paths on the roundabout.*

8. The **Separator Line Path Offset** is the minimum distance between the circulatory lane markings and the outer body envelope of the design vehicle turning in steady state around the roundabout.
9. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.

## Junction Properties: Swept Path Analysis: Design Vehicle <sup>(8797)</sup>

The Design Vehicle dialog is accessed from the Design Vehicles page of the Junction Properties dialog.

1. Select any vehicle and click **Edit** or **View**. The Design Vehicle dialog will appear.

The screenshot shows the 'Design Vehicle' dialog box. It has a title bar 'Design Vehicle' and a tab 'Design Vehicle'. The dialog contains the following fields and values:

Field	Value
Name	FTA Design Articulated Vehicle (1998)
Type	Articulated vehicle
Overall Width	2.55
Effective Front Overhang	1.36
Effective Rear Overhang	4.2
Tractor Effective Wheelbase	3.8
Trailer Effective Wheelbase	7.8
Effective Kingpin Offset	-0.68
Drawbar Length	0.0

There is a 'Select ...' button on the right side of the dialog. At the bottom are 'OK', 'Cancel', and 'Help' buttons.

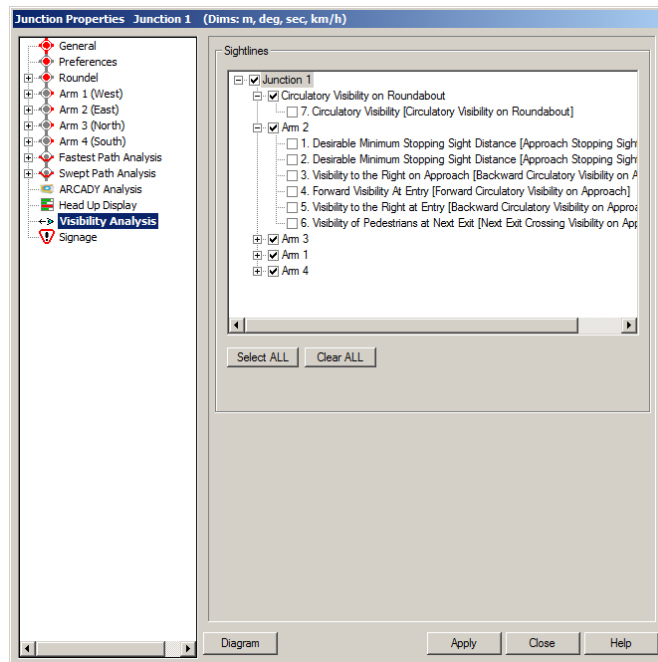
Junction Properties: Swept Path Analysis: Design Vehicle

2. Junctions can test vehicles with no more than two units. The trailer may have a drawbar front axle.
3. The design vehicle **Overall Width** is the width of the design vehicle at its widest point.
4. The design vehicle **Effective Front Overhang** is the distance from the effective front axle to the front-most point on the body.
5. The design vehicle **Effective Rear Overhang** is the distance from the effective rear axle to the rear-most point on the body.
6. The design vehicle **Tractor Effective Wheelbase** is the distance between the effective front and rear tractor axles.
7. The design vehicle **Trailer Effective Wheelbase** is the distance between the trailer effective front and rear axles or between the kingpin and the effective rear axle.
8. The design vehicle **Effective Kingpin Offset** is the distance from the effective rear axle back to the kingpin. If the kingpin is in front of the effective rear axle then the distance is negative.
9. The design vehicle **Drawbar Length** is the length of the drawbar (if any) between pivot points.
10. To take vehicle details straight from the Library Explorer click **Select**. The Library Explorer will appear. Select the required vehicle from the Library Explorer and click **OK**.

## Junction Properties: Visibility Analysis <sup>(8802)</sup>

Visibility sightlines are calculated automatically by AutoTrack if the standard you have selected includes them. Because roundabouts must typically be checked for many sightlines which would be confusing if they were displayed all at once, they may be displayed individually. The visibility tab displays the sightlines and allows you to select them for display.

1. Click **Visibility Analysis** in the left hand pane. The Visibility Analysis page will appear.



Junction Properties: Visibility Analysis

2. The sightlines are grouped by arm and circulatory area. Click the [+] to list all the sightlines for a given arm.
3. Tick the sightlines that you wish to display and click **Apply**. There's no need to close the properties dialog but you can if you wish.
4. Alternatively, you may wish to use the **Next Sightline** and **Previous Sightline** buttons on the toolbar or ribbon to display the sightlines in sequence.
5. The **Next Region** and **Previous Region** buttons allow you to display the currently selected sightlines but for the next or previous arm.
6. Use the **Select All** and **Clear All** buttons to tick or untick all the checkboxes.



Previous Sightline /  
Next Sightline buttons

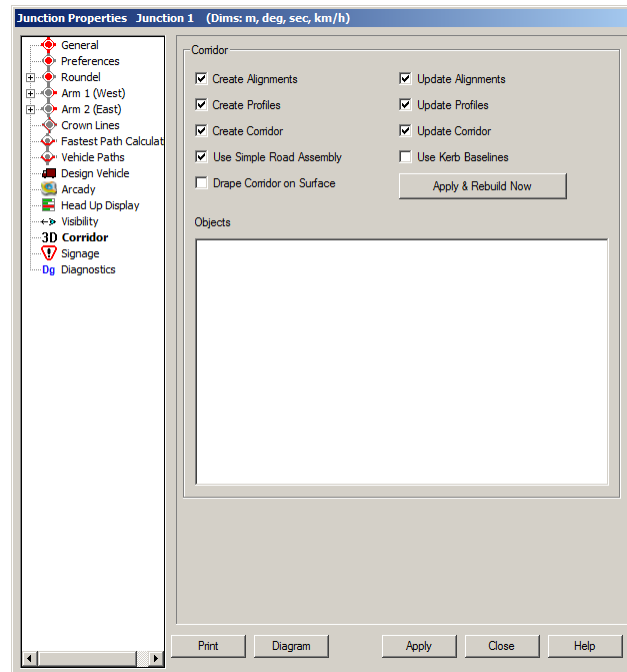


Previous Region /  
Next Region buttons

## Junction Properties: Corridor <sup>(8647)</sup>

If you are running AutoTrack on a supported platform you will have a corridor tab. This defines how the 3D model of the roundabout is built and updated.

1. Click **Corridor** in the left hand pane. The Corridor page will appear.



Junction Properties: Corridor

2. The checkboxes in the upper section of the page control how much of the 3D model AutoTrack creates and updates.
3. Tick **Create Alignments** to create horizontal alignments in your CAD system.
4. Tick **Update Alignments** if you want AutoTrack to update the alignments automatically when the geometry changes. This option is only available if AutoTrack created the original alignments, i.e. if **Create Alignments** is ticked.
5. Tick **Create Profiles** to create vertical profiles along the horizontal alignments.
6. Tick **Update Profiles** if you want AutoTrack to update the profiles automatically when the geometry changes. This option is only available if AutoTrack created the original profiles, i.e. if **Create Profiles** is ticked.
7. Tick **Create Corridor** to create a 3D corridor model using default assemblies.
8. Tick **Update Corridor** if you want AutoTrack to update the corridor automatically when the geometry changes. This option is only available if AutoTrack created the original corridor, i.e. if **Create Corridor** is ticked.
9. By default the corridor is built using simple assemblies consisting of just a road surface with no kerbs. This is the case when **Use Simple Road Assembly** is ticked. These assemblies are based

upon the Civil 3D **Primary Road Through Intersection** assembly with right and left subassemblies renamed to offside and nearside in accordance with your driving convention.

Untick **Use Simple Road Assembly** to use more complex assemblies for the entry and exit roads. These assemblies are based upon the Civil 3D **Primary Road Part Section – Daylight Right** (or Left) again with right and left renamed to offside and nearside in accordance with your driving convention.

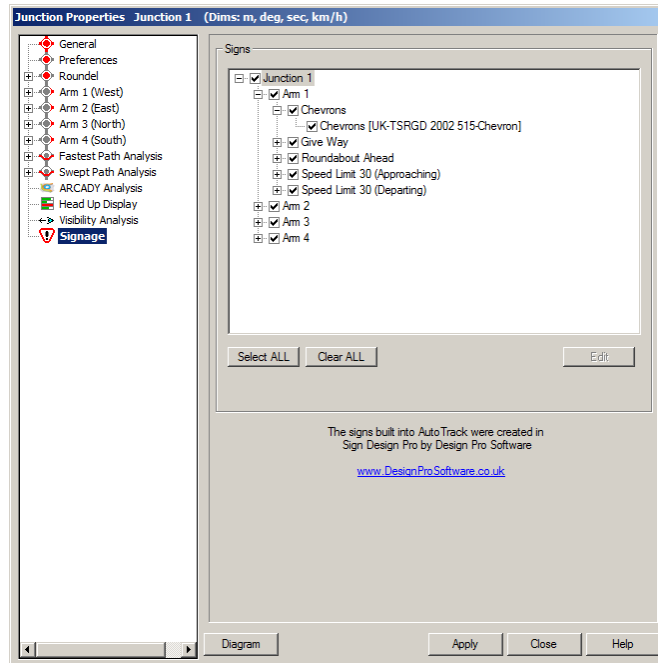
10. Normally you will probably want to construct the 3D model with calculated profiles; this is the default. To drape the corridor on the surface tick **Drape Corridor on Surface**. With this option enabled, the assemblies take their levels from the original surface profiles rather than the calculated profiles.
11. Regardless of any of the settings you can force a rebuild of all the selected elements by clicking **Update & Rebuild Now**.



## Junction Properties: Signage <sup>(8840)</sup>

Signage requirements are defined in the standard and placed automatically. However, they can be adjusted in Junction Properties.

1. Click **Signage** in the left hand pane. The Signage page will appear.



Junction Properties: Signage

2. The signs are grouped by arm and location. Click the **[+]** adjacent to an arm to list the sign locations.
3. Highlight a sign location and click the **Edit** button to make changes. (See [Junction Properties: Sign Location <sup>\(8845\)</sup>](#)).
4. Highlight a sign and click the **Edit** button to make changes to individual signs. (See [Junction Properties: Sign <sup>\(8850\)</sup>](#)).
5. Use the **Select All** and **Clear All** buttons to tick or untick all the checkboxes.

## Junction Properties: Sign Location <sup>(8845)</sup>

1. Select a sign location in the right hand pane and click **Edit**. The Sign Location page will appear.

**Sign Location**

☒ Enabled

Name: Chevrons

Position: On Centre Island Opposite Arm

Min Max

Lateral Offset: From Offside Kerb 0.3

Longitudinal Offset: From Crossing then Yield Line 0.3

Post Height: Above Gully Level 1.0

Angular Adjustment (deg): 0.0

Number of Posts: 2

Post Spacing: 1.524

Post Radius: 0.05

Show 2D Images: ☒ Apply to this sign only

Reference:

OK Cancel

Junction Properties: Sign Location

2. Tick **Enabled** to display this sign.
3. You cannot change the **Name** of the sign.
4. Select the **Position** from the drop down list. Signs may be positioned **On Approach Road**, **On Departing Road**, **On Centre Island** or **On Splitter Island**.
5. Signs are positioned relative to road features so that when the road geometry changes the signs can be adjusted too.
6. The **Lateral Offset** is the straight line distance **From Nearside Kerb**, **From Nearside Definition Line**, **From Offside Kerb**, **From Offside Definition Line** or **From Centreline**.
7. The **Longitudinal Offset** is the straight line distance **From Yield Line**, **From Crossing**, **From Crossing Then Yield Line**, **From Centre of Roundabout**.
8. The **Post Height** is measured **Above Road Alignment Level**, **Above Gully Level**, **Above Crown Level**, **Above Kerb Level** or **Above Post Ground Level**.
9. Signs on approach or departing roads are aligned to the road alignment at the sign offset by default. Signs on the centre island are aligned to face directly outwards radially by default.
10. To rotate all the signs at this location set the **Angular Adjustment**. This is measured positive anti-clockwise.

11. By default signs have a single post centred on the sign width. To specify multiple posts enter the **Number of Posts** and the **Post Spacing**.
12. The **Post Radius** defaults to 50mm but can be changed if required.
13. Tick **Show 2D Images** to place true scale images of the signs adjacent to the sign post oriented to the direction they face. Select from the adjacent drop down list to **Apply to this sign only**, **Apply to entire Arm** or **Apply to entire Junction**.
14. Enter a **Reference** if required.
15. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.

## Junction Properties: Sign <sup>(8850)</sup>

1. Select a sign in the right hand pane and click **Edit**. The Sign page will appear.

**Sign**

☒ Enabled

Name Chevrons

Type Fixed Sign

Appearance UK-TSRGD 2002 515-Chevron

Size H: 600 W: 1800

	Min	Max
Mounting Height	1.0	
Mounting Offset	0.0	
Angular Adjustment (deg)	0.0	

Reference

OK Cancel

Junction Properties: Sign

2. Tick **Enabled** to display this sign.

### Note

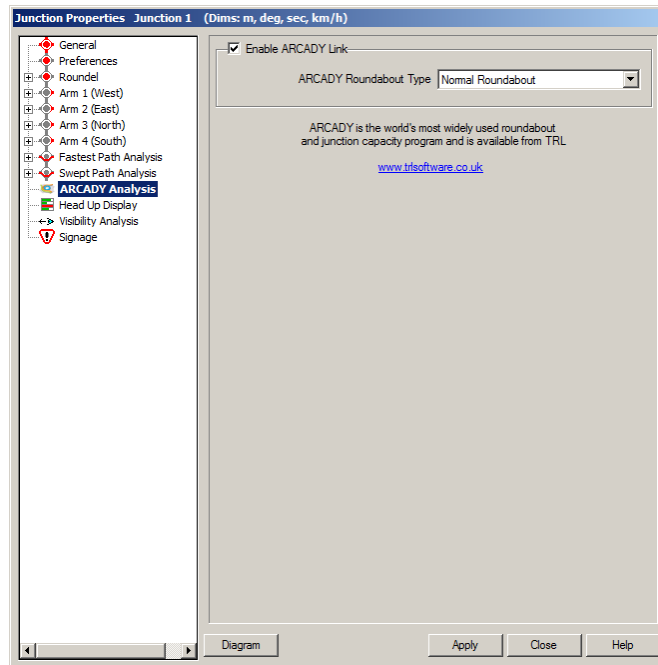
*If you disable a sign in Junction Properties that is defined as mandatory in the standard an audit exception will be generated.*

3. You cannot edit the sign **Name**, **Type** or **Appearance**.
4. Select the required **Size** from the drop down list.
5. The **Mounting Height** is measured above the sign post datum which is specified in the Sign Location dialog.
6. Use **Mounting Offset** to place a sign offset to the right or left of the sign post. This value defaults to zero.
7. If you wish to rotate this sign relative to others on at the same location then enter the **Angular Adjustment**. To rotate all signs at a location enter the **Angular Adjustment** on the sign location.
8. Enter a **Reference** if required.
9. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard.

## Junction Properties: Arcady <sup>(8800)</sup>

If you have ARCADY then you can benefit from the automatic 2-way transfer of data between it and Junctions. This page lets you choose what you see in the head-up display (HUD).

1. Click **Arcady** in the left hand pane. The Arcady page will appear.



Junction Properties: Arcady

2. Tick **Enable ARCADY Link** to invoke the link for this junction.
3. If you have a compatible version of ARCADY installed with the link feature enabled then ARCADY will start automatically and, by default, minimised.
4. Currently the link only supports normal roundabouts.

---

## Head up display

The head up displays (HUD's) show critical design values related to each arm. By default they appear adjacent to each arm but they can also be displayed in a single table if required (see [Junction Properties: Head Up Display](#) <sup>(8617)</sup>).

Each HUD has two grips, the one at the bottom left allows you to move it and the one at the top right lets you resize it (up to 5 times normal size). If the HUD is close to the roundabout leader lines will not be shown, even if specified, in the interests of clarity.

The colour of the frame, line style and thickness may be changed using the HUD style (see [Drawing Settings: Styles: Drawing Style](#) <sup>(2330)</sup>).

### Design radii & speeds

The displayed data is colour coded to allow quick interpretation. The critical design radii and speeds calculated by AutoTrack are shown green if they are within the limits specified in the standard and red if outside them. These values may also appear in amber when they get close to a limiting value if the user has defined a proximity warning percentage (see [Junction Properties: Fastest Path Analysis: Vehicle Paths](#) <sup>(8790)</sup>).

R1 to R3 and the corresponding V1 to V3 relate to the 'through' path, i.e. the nominally straight path through the roundabout. If there is no such path, these values will display as N/A. Likewise, R4 and R5 (V4 and V5) relate to the 90 degree and 270 degree turns respectively and if either of these is not present this value is also displayed as N/A.

### ARCADY values

The data passed back from ARCADY is displayed in the colours and units specified in the corresponding ARCADY data file.

### Other values

You can also display the analysis input values in the HUD as well as some other geometric data such as the ICD (see [Junction Properties: Head Up Display](#) <sup>(8617)</sup>). These values are displayed numerically with no colour coding.

---

# The ARCADY-AutoTrack Link

ARCADY 7.1 or above, available from TRL, can communicate with AutoTrack Junctions 9.01 or above. The ARCADY-AutoTrack link is a two way dynamic data link that allows AutoTrack Junctions users to view ARCADY results directly in AutoTrack. The link operates in real time with AutoTrack passing geometric data to ARCADY which in turn passes back the roundabout performance values which are then displayed on the junction in AutoTrack.

To use the link you will need:-

- a full copy of AutoTrack Junctions 9.01 or above (the link is not available on the demo version)
- a full copy of ARCADY 7.1 or above
- if you do not have ARCADY 8 then you will also need the registered ARCADY-AutoTrack link component within ARCADY

The link must be enabled from both applications to work.

In AutoTrack the link is controlled by two AutoTrack switches, one global in system settings, and the other per junction accessed from the Junction Properties dialog. This allows you to enable the link for selected junctions and provides a convenient means of switching the link on and off for all junctions.

Refer to the ARCADY documentation for how to register and enable the link in ARCADY.

## How the link works

The benefit of the link is that, for the first time, the roundabout designer can see both geometric and performance data at the same time. This encourages a much faster design cycle than using traditional methods. As the roundabout is created in AutoTrack calculates and sends the main roundabout geometries to ARCADY. ARCADY receives and displays the data read-only to indicate that the data is being provided by AutoTrack. ARCADY then performs a full model run and passes back to AutoTrack the main results (Queue, Delay, RFC & LOS) which are displayed in AutoTrack. Note that AutoTrack does not manipulate the data received from ARCADY in any way.

Users may enter traffic and other non-geometric data in ARCADY the usual way and these will obviously affect the results passed back to AutoTrack.

The link is automatically started by AutoTrack if necessary and creates and opens data files as required. The ARCADY data file is created in the same directory as the AutoTrack file and has the same root name, e.g. if you invoke the link from AutoTrack using a data file called `EXAMPLE.DWG`, it will open or create (if necessary) a file called `EXAMPLE.ARC7`.

When the AutoTrack file is saved AutoTrack tells ARCADY to save the corresponding ARCADY file so that they remain synchronised.

## Multiple versions of ARCADY

AutoTrack will always run the newest compatible version of ARCADY it finds. So, if both ARCADY 7.1 and ARCADY 8 are installed, AutoTrack

will run ARCADY 8. However, if a compatible version of ARCADY is already running AutoTrack will use that even if there is a newer version installed.

If AutoTrack is running with ARCADY 8 and you open an existing dataset, it will instruct ARCADY 8 to load the ARC8 data file if it exists, otherwise the ARC7 file. In this way AutoTrack handles ARCADY upgrades seamlessly and intuitively.

If AutoTrack is running with ARCADY 7 and you open an existing dataset for which only an ARC8 file exists, AutoTrack will instruct ARCADY to create a new data file because ARCADY 7 cannot read ARCADY 8 files.

## Configuring the link within ARCADY

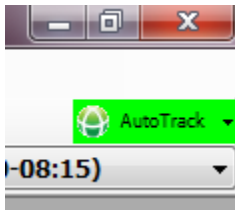
ARCADY is started automatically by AutoTrack so there is no need to prepare anything other than to ensure that you have a full copy of ARCADY 7.1 or above and that you have registered the link.

If you do not have a compatible version of ARCADY installed, AutoTrack will warn you when you try to enable it.

If you have a compatible version of ARCADY but the ARCADY-AutoTrack link is not registered then ARCADY will warn you when it is started.

Once started the AutoTrack menu within ARCADY allows you to check or configure the link. You should refer to the ARCADY documentation for full details but suffice to say, a green menu indicates that at least one file in ARCADY is controlled by AutoTrack.

There are options to change the listener port but you must ensure that both programs are using the same port. (See also [System Settings: Junctions: Arcady Link \(Junctions only\)](#) <sup>(2220)</sup>)



*AutoTrack menu in ARCADY*

## To invoke the link for a selected junction



*Edit Junction button*

24. There are two ways to invoke the link, the 'official' way and a more convenient quicker way. First the 'official' way:-

1. Select a junction with at least two arms.

### Note

*The link may not work correctly for fewer than two arms.*

2. Click the **Edit Junction** button on the Junctions toolbar or select **Edit Junction** from the Junctions drop down menu.
3. Select the ARCADY tab.
4. Tick the **Enable ARCADY Link** checkbox. This action will also enable the global switch if it is disabled.
5. Select the data items that wish to see in the HUD.
6. Apply and close the Junction Properties dialog.
7. AutoTrack should start ARCADY, if it is not already running, and attempt to connect to it. If it succeeds the selected data will appear in the HUD's.

### Note



*The connection process may take a few seconds, especially if AutoTrack has to start ARCADY.*

25.



Refresh Data Link button

Now the slightly quicker way:-

1. Select a junction.
2. Click the **Refresh Data Link** button on the Junctions toolbar or ribbon.
3. Depending on the state of your system, you may be prompted first to confirm that you want to switch on the ARCADY Link, and then that you want to enable the link on the selected junction.
4. If you confirm both prompts, ARCADY will start (if not already running), AutoTrack will attempt to connect and within a few seconds you should see the data in the HUD's.

## To disable the link for all junctions

1. Click the **System Settings** button on the AutoTrack toolbar or ribbon or select **System Settings** from the AutoTrack drop down menu.
2. Expand the Junctions tab and select the ARCADY Link tab.
3. Untick **Enable ARCADY Link**.

## To disable the link for a selected junction

1. Select the junction.
2. Click the **Edit Junction** button on the Junctions toolbar or select **Edit Junction** from the Junctions drop down menu.
3. Select the ARCADY tab.
4. Untick the **Enable ARCADY Link** checkbox.
5. Apply and close the Junction Properties dialog.
6. The ARCADY data will disappear from the HUD's.

## Automatic vs Manual operation

By default the link operates automatically, transferring data back and forth as and when required. However, you may wish to work in manual mode whereby the ARCADY data in the HUD's and in the Junction Report is updated only when the junction is resynchronised (see [Making changes in ARCADY](#)

[You may enter non-geometric data in ARCADY at any time. Values that are controlled by AutoTrack are read-only, any others may be changed. To update the AutoTrack display for changes made to ARCADY data you will need to synchronise the data by clicking the Refresh Data Link button in AutoTrack \(see To resynchronise a junction below\).](#)

### Warning

Not all items that you can add in AutoTrack are passed to ARCADY. For example, you can add pedestrian crossings in AutoTrack but they are not sent to ARCADY. Likewise, although AutoTrack models mini-roundabouts, ARCADY does not yet process this data when sent from AutoTrack.

### To resynchronise a junction

To set manual updating:-

1. Click the **System Settings** button on the AutoTrack toolbar or ribbon or select **System Settings** from the AutoTrack drop down menu.
2. Expand the Junctions tab and select the ARCADY Link tab.
3. Tick **Manually update results**.

### **Tip**

*Close any dialogs in ARCADY that you don't actually need open because the process of writing the data to them can slow the data transfer noticeably. This occurs even if the ARCADY dialogs are not visible or, indeed, minimised and is especially important if you have automatic updating enabled.*

## **Making changes in ARCADY**

You may enter non-geometric data in ARCADY at any time. Values that are controlled by AutoTrack are read-only, any others may be changed. To update the AutoTrack display for changes made to ARCADY data you will need to synchronise the data by clicking the **Refresh Data Link** button in AutoTrack (see [To resynchronise a junction](#) below).

### **Warning**

*Not all items that you can add in AutoTrack are passed to ARCADY. For example, you can add pedestrian crossings in AutoTrack but they are not sent to ARCADY. Likewise, although AutoTrack models mini-roundabouts, ARCADY does not yet process this data when sent from AutoTrack.*

## **To resynchronise a junction**

The Resync button forces an exchange of all data between AutoTrack and ARCADY. Select the junction to be synchronised.

1. Click the **Refresh Data Link** button on the Junctions toolbar or select **Refresh Data Link** from the Junctions drop down menu.
2. All data for the selected junction will be sent to ARCADY and the results displayed in AutoTrack. You may see the out of date symbol briefly.



Refresh Data Link button

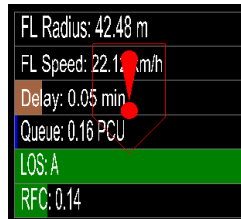
### **Tip**

*The **Refresh Data Link** button also provides a convenient way to invoke the link. If you select a junction that is not currently enabled for the ARCADY link and click the **Refresh Data Link** button, the link will be started automatically.*

## Warnings & errors

### ***Update Required***

The ARCADY data will be updated automatically whilst the link is active. If for any reason the link is interrupted you will see a symbol that indicates that the ARCADY data is out of date. In fact you will often see this symbol flash up in normal use as you adjust the geometry. Whilst the symbol is displayed you should regard the ARCADY values with suspicion.



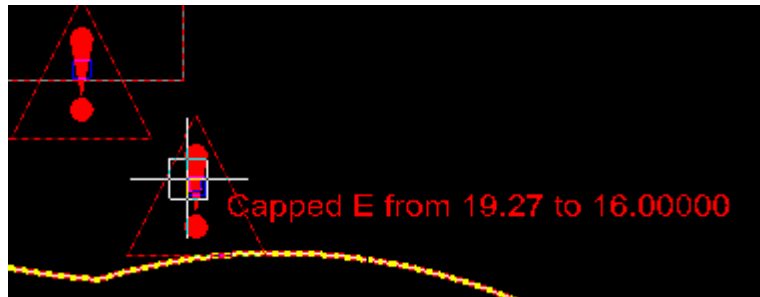
Head up display showing Out of Date symbol

### ***ARCADY run time errors***

If there is an error in the ARCADY run the results in the HUD's will show as 'ERROR!'. If this happens you should switch to ARCADY and check the task list to find the cause.

### ***Capped Values***

AutoTrack allows users to enter values that exceed the standard subject to a suitable justification. However, ARCADY will cap these values before performing any calculations and send a warning to AutoTrack which will be displayed close to the affected arm.



Capped value warning

---

## Fastest path

### Calculation

Almost all roundabout design documents leave the alignment of the fastest path line up to the designer.

The UK standards describe it as 'the smoothest, flattest path that a vehicle can take through the entry, round the centre island and through the exit (in the absence of other traffic)'.

The US standards describe it as 'the smoothest, flattest path possible for a single vehicle, in the absence of other traffic and ignoring all lane markings, traversing through the entry, around the central island, and out the exit'.

AutoTrack creates the path as follows:-

1. create a bounding envelope from the defined kerb and centreline offsets (defined in the standard)
2. fix the start and end stations (defined in the standard)
3. connect the start and end stations with a straight drive line
4. where the drive line cuts the boundary calculate a new station on the boundary at the point furthest away from the drive line
5. connect the new list of stations with a new straight drive line
6. repeat steps 4 and 5 until the drive line does not cut the boundary
7. optimise the line to remove redundant points which might force artificially tight radii
8. create a smooth interpolated Bezier curve through the fixed stations

---

## AutoCAD Civil 3D enhancements

When AutoTrack is run on certain CAD systems extra functionality is available that allows you to go construct part or all of a 3D corridor model. CAD systems that currently offer this functionality, and the degree to which it is supported, are as follows:-

- AutoCAD Civil 3D 2010 (create / update alignments and profiles only)
- AutoCAD Civil 3D 2011 (create / update corridor with unnamed baselines and regions and untargeted regions)
- AutoCAD Civil 3D 2012 (create / update corridor with unnamed baselines and regions and untargeted regions)
- AutoCAD Civil 3D 2013 (create / update corridor with named and targeted regions)

On these platforms AutoTrack can optionally create the following:-

- Horizontal alignments along each nearside and offside definition line, the ICD, the apron, the island and the circulatory area crown line
- Vertical profiles along the alignments

- 3D corridor model using provided assemblies

The creation of these objects when the junction initially created is controlled by the **Corridor** drawing settings (see [Drawing Settings: Junctions: Corridor](#)<sup>(2037)</sup>) and, once the junction has been created by the **Corridor** junction properties (see [Junction Properties: Corridor](#)<sup>(8647)</sup>).

AutoTrack may also be configured so that every time the roundabout geometry is changed these alignments, profiles and corridor are automatically rebuilt.

This roundabout object is also linked to the polylines or alignments upon which it is based. So, if you create your roundabout based upon existing Civil 3D alignments, the roundabout will update automatically when you move these alignments. This functionality allows you to build AutoTrack roundabouts into existing corridor models and have them behave like a Civil 3D intersection object.

## Entity Names & Layers

AutoTrack creates the following entities:-

The following alignments on layer {Junction Name}Alignments:-

```
{Junction Name}RoundelApron
{Junction Name}RoundelCirculatoryCrown
{Junction Name}RoundelInscribedCircle
{Junction Name}RoundelIsland
{Junction Name}RoundelMergeLine
{Junction Name}RoundelSecondaryCirculatoryCrown
{Junction Name}{Arm Name}Alignment
{Junction Name}{Arm Name}Crown
{Junction Name}{Arm Name}NearsideKerb
```

The following profiles on specified layers:-

Name	Layer
AdjustedLevels	{Junction Name}AdjustedProfiles
FixedLevels	{Junction Name}FixedProfiles
{Surface Name}	{Junction Name}SurfaceProfiles

The following assemblies on layer {Junction Name}Assemblies:-

```
{Junction Name}RoundelApron
{Junction Name}RoundelCirculatoryCrown
{Junction Name}{Arm Name}Crown
```

A corridor named:-

```
{Junction Name}
```

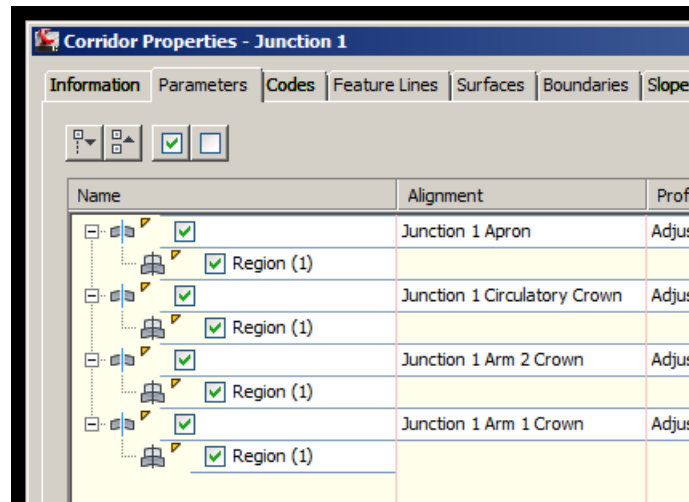
## Baselines and Regions <sup>(8990)</sup>

When running in Civil 3D 2013, AutoTrack names baselines after the alignments on which they are based, less the {Junction Name} part. Each baseline has its own assembly which has the same name as the

alignment. Each baseline has a single region named Region (1). Also, when running in Civil 3D 2013 AutoTrack targets the region to the appropriate alignment.

However, due to limitations in Civil 3D 2011 & 2012, AutoTrack is unable to name baselines and nor can it target regions, so this must be done manually as follows:-

1. Select the corridor and click **Corridor Properties** on the Civil 3D ribbon.
2. In the Corridor Properties dialog, select the **Parameters** tab.



Civil 3D 2012 Corridor Properties dialog

3. The first column in this dialog contains the baselines, each with the associated regions indented. The second column contains the alignment on which the baseline is based.
4. Click in the first baseline field, in this case the one associated with the alignment 'Junction 1 Apron', and enter an appropriate name. The name that AutoTrack would create in Civil 3D 2013 is the name of the base alignment but without the junction name, i.e. 'Apron'. Whatever you do name it sensibly because it's very easy to get lost if your entities and objects are not clearly named.
5. Repeat this for the other baselines.
6. Each region must be targeted for width and height. The assemblies are inserted on the crown baselines.
7. Irrespective of driving convention the regions should be targeted for width as follows:-

Baseline / Region	Nearside / Offside Target Alignments
Apron	Secondary Crown / Island
Circulatory Crown	Merge Line / Secondary Crown
Arm	Nearside Kerb / Alignment

And, irrespective of driving convention, the regions should be targeted for height to the adjusted levels profiles as follows:-

Baseline / Region	Nearside / Offside Target Profiles
Apron	Secondary Crown / Island
Circulatory Crown	Merge Line / Secondary Crown
Arm	{None} / Alignment

If using complex arm assemblies the region should be targeted to

the existing ground surface so that the cut/fill subassembly creates the correct cuttings and embankments.

---

## Junction Report (8810)

The Junction Report is a dynamically updated display of the fastest path speed and entry radius and ARCADY data.

### To display the junction report



*Junction Report button*

1. Select **Junction Report** from the AutoTrack, Junctions menu, click the **Junction Report** button on the AutoTrack Junctions toolbar or type `ATRAJUNCTIONREPORT` on the command line. The Junction Report dialog will appear.

Timestamp	Junction	Arm	Seq	LOS	RFC	Queue	Delay	Max Speed
14:47:12.244	1	1	10/10	A	0.37	0.58	5.22	37.48
14:47:12.247	1	2	10/10	A	0.37	0.58	5.27	35.73
14:47:12.250	1	3	10/10	A	0.35	0.53	4.77	27.18
14:47:12.241	1	4	10/10	A	0.34	0.52	4.70	30.27

Junction Report dialog

2. Click **Close** when you no longer need it.

### To customise the junction report

1. Click the **Customise** button on the Junction Report dialog. The Customise Report dialog will appear.

<input checked="" type="checkbox"/> Timestamp
<input checked="" type="checkbox"/> Junction
<input checked="" type="checkbox"/> Arm
<input checked="" type="checkbox"/> Seq
<input checked="" type="checkbox"/> LOS
<input checked="" type="checkbox"/> RFC
<input checked="" type="checkbox"/> Queue
<input checked="" type="checkbox"/> Delay
<input checked="" type="checkbox"/> Max Speed

Customise Report dialog

2. Select the specific criteria you wish to report by. **Timestamp** and **Seq** are really internal values that are of little use to the end user, **LOS**, **RFC**, **Queue** & **Delay** are ARCADY values the **Max Speed** is the fastest path speed. The Junction Report will change when you click **OK**.

### To export a junction report

1. Click the **Export** button on the Junction Report dialog. A Save As dialog will appear.
2. Select the type of delimited file you wish to save from the **Save as type** drop down list.



3. Browse to the directory in which you wish to save the file.
4. Name the file without the extension and click **Save**.
5. The saved file may be read into Excel or any other program that supports comma or tab delimited files.

---

## Adjusting junctions using grip editing

The Junction Properties dialog is ideal for making precise changes to dimensions but for general 'what-if' analyses grip-editing can be invaluable.

### To grip edit a junction

1. Select the junction you want to edit.
2. Grips appear at key points on the junction. As you move the cursor over a grip the grip tip is displayed.
3. The green grip near the centre of the junction is used to move the entire junction, the other blue grips are used to move or resize features of the junction.
4. Left click on a grip to select it.
5. Move the cursor and some or all of the junction will be shown ghosted and moving with the cursor. The style sheet lets you control which elements are ghosted during grip editing (see Style Settings).
6. As you move the cursor you may see one or more dynamically updated dimension lines connecting the selected grip to other features. These are there to help you grip edit.
7. Left click again to confirm the new position for the grip or right click to cancel.

### Constraints

Constraints are one of the benefits of grip-editing over manual editing in the Junction Properties dialog.

In general elements are moved independently of other features wherever possible. However, this often requires associated dimensions to change. For example, adjusting the centre island diameter will force the outermost circulatory lane width to change.

If you hold down the <Ctrl> key whilst moving a grip other elements are constrained to move at the same time. So, in the example above, changing the centre island diameter with the <Ctrl> key down also changes the apron and inscribed circle diameter to change whilst the lane widths remain the same.

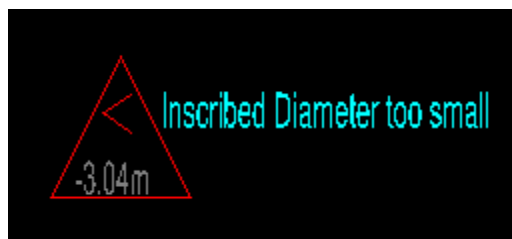
Grip	Effect without <Ctrl>	Effect with <Ctrl>
Inscribed Circle Grip	Outermost circulatory lane width changes. Inner limit, outermost circulatory lane width zero. Outer limit, blend point.	Lane widths remain constant and central island and apron change size. Inner limit, centre island radius zero.

		Outer limit, blend point.
Centre Island Grip	Outermost circulatory lane width changes. Inner limit, centre island radius zero. Outer limit, outermost lane width zero.	Lane widths remain constant and apron and inscribed circle size change. Inner limit, centre island radius zero. Outer limit, inscribed circle at blend point.
Apron Width Grip	Outermost circulatory lane width changes. Inner limit, apron width zero. Outer limit, outermost circulatory lane width zero.	Lane widths remain constant and inscribed circle changes size. Inner limit, apron width zero. Outer limit, inscribed circle at blend point.
Lane Grips	Outermost circulatory lane width changes. Inner limit, lane width zero. Outer limit, outermost circulatory lane width zero.	All lane widths outside remain constant and inscribed circle changes size. Inner limit, lane width zero. Outer limit, inscribed circle at blend point.
Road Width Grip	Road width on one side of centreline only changes.	Road widths on both sides of central divide change.
Centre Gap Width Grip	Lane widths change as centre gap width changes.	Lane widths remain constant as gap width changes.

## Warnings

### Geometric warnings

In some cases moving a grip or changing a value in the junction properties dialog may cause a warning triangle to be displayed. These occur when a value goes outside the limits recommended by the adopted standard.



Warning triangles

Alongside the warning triangle a short description of the problem is displayed. The visibility and format of this short warning is controlled by

the Warning Symbol style. If there is a symbol within the triangle it provides additional information. For example, in our example, '< -3.04' means that the inscribed circle diameter is 3.04m less than the minimum recommended in the standard. These values update dynamically so you should be able to grip edit your junction quite precisely without resorting to the junction properties.

In addition, if you move the cursor over the centre of the triangle a longer, more detailed warning text will appear, e.g. 'The current value for Inscribed Circle Diameter (24.9604) is less than the minimum value specified in the standard (28.0000)'. The visibility and format of these longer messages is controlled by the Warning Symbol Floating Text style.

**Note**

*If you don't see the warning triangles then it's because you've got them switched off in the style editor.*

## Fastest Path warnings

Even though US standards require checks of only R1 to R3 on through paths, only R4 on left turns and only R5 on right turns, internally AutoTrack calculates the entry, circulating and exit radii of all paths through the roundabout.

We show the fastest path from each leg based upon the R1 to R5 values and display the relevant R1 to R5 values in the HUD. However, having identified the fastest route, we then check the entry and exit radius of the right and left turns against the limiting values for R1 and R3 respectively.

You may therefore see warnings for radii and/or speeds that do not equate to one of the values in the HUD.



# Junctions: Creating and editing standards

The default size and shape of a junction is controlled by a standard. The standard may also specify limiting values for some or all of the geometric parameters of the junction.

---

## AutoTrack junction standards

All junctions are created in accordance with defined rules or standards.

A number of standards are provided with the program and these may be used as the basis for your own company standards. The standards are grouped by nationality so, for example, the UK junction standards are held within a file called `UK_xxx.ATJ`, where xxx is the most recent version of AutoTrack that can read it, e.g. `UK_890.ATJ`. Additional junction standards are available for different markets and can even be created by users themselves. However, to ensure that the details do not change arbitrarily, there are restrictions on who can edit them. These restrictions require that users identify themselves if they wish to access a standard to make changes. No password is needed simply to use a standard.

### Access to junction standards

Access to junction standards is restricted using a username / password system such that before a standard file can be opened for editing they must enter his or her name and password. Only if the user is authorised will they be allowed to open the standard file. There are three levels of access:-

#### None

You may list the standards but cannot access the details. This is the status of any standards that have not been purchased.

#### Read Only

You may use the standard file but may not change them or add new standards. All standard files are initially opened Read Only.

#### Full Access

You may use, copy, edit, or create new standards and add or edit the users.

All Savoy junction standards are Read Only.

Refer to [Viewing a standard in a junction standard file or the pool \(Junction Standard Explorer dialog\)](#) <sup>(4300)</sup> and [Creating a new junction standard file \(Junction Standard File dialog\)](#) for details of how to open standards files and maintain users.

## Access to junction standards in the Pool

Once in the Pool a junction standard may only be edited if it has not been used.

### Note

*If you make a copy of a standard in the same standard file it's name is prefixed with the words 'Copy of' to distinguish it from the original standard.*

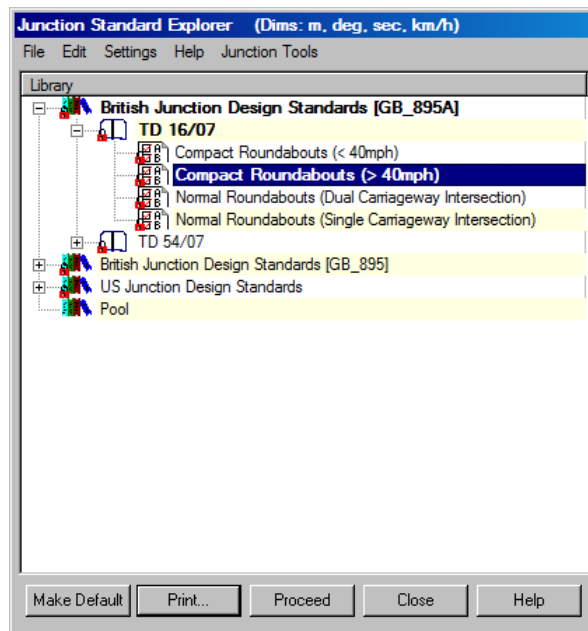
---

## Viewing a standard in a junction standard file or the pool (Junction Standard Explorer dialog) <sup>(4300)</sup>



Junction Standard Explorer button

1. Select **Junction Standard Explorer** from the AutoTrack, Junctions menu or click the **Junction Standard Explorer** button on the AutoTrack Junctions toolbar. The Junction Standard Explorer will appear. For details of the standards see [Viewing or editing parking standards](#).



Junction Standard Explorer dialog

2. If the standard that you require is not loaded then select **Open Junction Standard** from the **File** menu in the Junction Standards Explorer, browse to find the standards file and click **Open**. A new Junction Standards File icon will appear in the Junction Standards Explorer with the name of the standard file beside it.
3. Click on the + symbol to expand the standard file or the pool.
4. Standards may be listed under different groups. If they are then click the + symbol to expand the required group.
5. Highlight the required standard (indicated by a check list icon) and select **Edit** (or **View** if the standards file is locked) from the **Edit** menu. The Junction Standard dialog will appear.
6. If you wish to edit a Standard Group then highlight it and select **Edit** (or **View** if the standards file is locked) from the Edit menu. The Junction Standard Group dialog will appear.

7. To create a new junction standard, highlight the parent file or group and select **New Junction Standard** from the File menu.
8. To print a standard highlight it and select **Print** from the File menu or click the **Print** button.

## Creating a new junction standard file (Junction Standard File dialog)



*Junction Standard Explorer button*

1. Select **Junction Standard Explorer** from the AutoTrack, Junctions menu or click the **Junction Standard Explorer** button on the AutoTrack Junctions toolbar. The Junction Standard Explorer dialog will appear.
2. Select **New Junction Standard File** from the File menu in the Junction Standard Explorer. The Junction Standard File dialog will appear.

The image shows the 'Junction Standard File' dialog box. It has two tabs: 'Library Standard File' (selected) and 'Users'. The 'Library Standard File' tab contains the following fields:

- Name:** British Junction Design Standards
- Filename:** D:\ATR\CD1\BIN\Library\GB\_895A.ATJ
- Version:** (empty text box)
- Notes:** (empty text area)
- Format:** v8.80
- Status:** Full Access

At the bottom right of the dialog are three buttons: OK, Cancel, and Help.

Junction Standard File dialog

3. Click the appropriate tab to edit or view the settings.
4. Edit the data as required and click **OK** to confirm when you are satisfied. Click **Cancel** to abort all changes and close the dialog.

### Junction Standard File: Junction Standard File

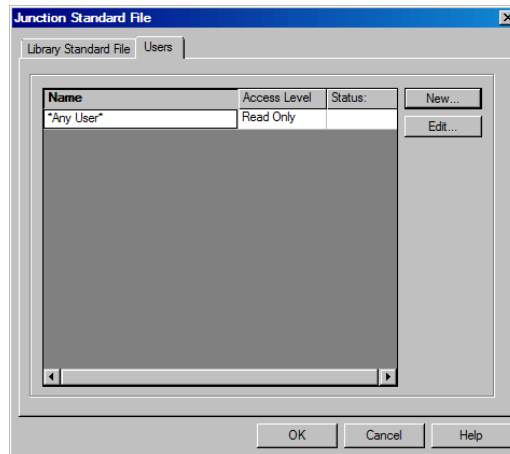
1. Click the Junction Standard File tab.
2. Give the standard file a meaningful **Name**.
3. The **Version** and **Notes** fields are provided for additional information and may be used at your discretion.
4. The **Filename** is read only and will be filled in when the file is saved.

### Junction Standard File: Users

26. **Note**

*You may only add new users or edit existing users in standard files to which you have full access rights.*

1. Click on the **Users** tab.

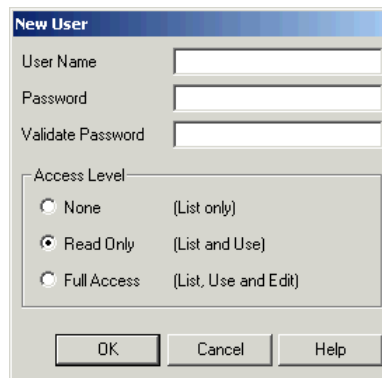


Junction Standard File: Users

2. On a new standard file all users have full access as indicated by the default entry in the Users table. At least one user in the table must have full access before you may downgrade the default Any User rights.

**To add a new user**

1. On the Junction Standard File dialog click **New**. The New User dialog will appear.



New User dialog

2. Enter the new **User Name**. Depending upon how you want to restrict access, this may be a specific person or a department name.
3. Enter the **Password** and then repeat it in the **Validate Password** field. This checks that you typed the password correctly. If you do not enter a password the named user will be able to unlock the standard file without typing a password.
4. Finally set the **Access Level**. We recommend that you add any users that you want to have full access and then downgrade the default Any User to Read Only.



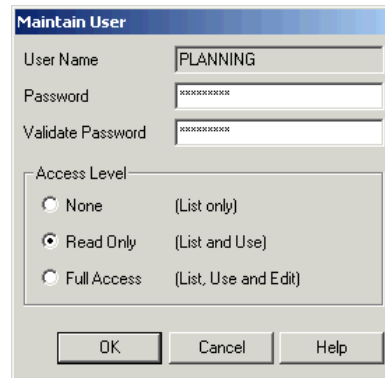
5. Even tighter restrictions can be placed by downgrading Any User to No Access and adding Read Only users as required. However, this may prove problematic in practice.

### ***To edit an existing user (Maintain User dialog)***

#### **Note**

*You may only add new users or edit existing users in libraries to which you have full access rights.*

1. On the Junction Standard File dialog highlight the user that you wish to edit and click **Edit**. The Maintain User dialog will appear.

The image shows a 'Maintain User' dialog box. It has a title bar 'Maintain User'. Inside, there are three text input fields: 'User Name' with 'PLANNING' entered, 'Password' with masked characters, and 'Validate Password' with masked characters. Below these is a section titled 'Access Level' containing three radio button options: 'None (List only)', 'Read Only (List and Use)' (which is selected), and 'Full Access (List, Use and Edit)'. At the bottom are three buttons: 'OK', 'Cancel', and 'Help'.

Maintain User dialog

2. Change the **Password** and / or set a new **Access Level** and click **OK** to confirm. If you do not enter a password the named user will be able to unlock the standard file without typing a password.
3. Click **Cancel** to abort any changes.

#### **Note**

*You cannot delete users; instead you must set their access level to **None**.*

---

## **Saving a junction standard file**



*Junction Standard Explorer button*

1. Select **Junction Standard Explorer** from the AutoTrack, Junctions menu or click the **Junction Standard Explorer** button on the AutoTrack Junctions toolbar. The Junction Standard Explorer will appear.
2. Highlight the standard that you want to save, right click and select **Save Junction Standard File As** from the drop down menu that appears. The Save Junction Standard File As dialog will appear.
3. Browse to the required storage directory, enter the filename and click **Save**.
4. If the standard file already has a name then you can use **Save Junction Standard File**.

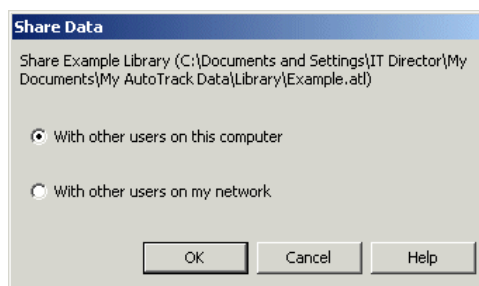
---

## **Sharing a junction standard (Share Data dialog)**



*Junction Standards Explorer button*

1. Select **Junction Standards Explorer** from the AutoTrack, Junctions menu or click the **Junction Standards Explorer** button on the AutoTrack Junctions toolbar. The Junction Standards Explorer will appear.
2. Highlight the standard that you want to share, right click and select **Share Data** from the drop down menu that appears.
3. The Share Data dialog will appear.



Share Data dialog

4. Select who you want to share the standard with and click **OK**.

If you select **With other users on this computer** a copy will be placed in the public data directory on your computer.

If you select **With other users on my network** a copy will be placed in the shared data directory (if one is defined).

## Printing a junction standard



*Junction Standards Explorer button*

1. Select **Junction Standards Explorer** from the AutoTrack menu or click the **Junction Standards Explorer** button on the AutoTrack toolbar. The Junction Standards Explorer will appear.
2. Highlight the standard that you want to print and click the **Print** button at the bottom. The Print dialog will appear.
3. Adjust the printer settings if necessary and click **OK**.

## Copying standards and units using drag and drop

Junction standards are automatically copied to the Pool when they are used but you may wish to edit a standard before using it or indeed build your own junction standards.

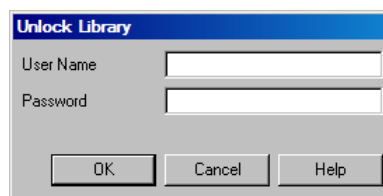
To copy a junction standard to the pool, select it, drag it over the Pool symbol and drop it. If you wish to copy it to another standard you will need full access rights in the destination junction standard file. The cursor will change to a no entry symbol to indicate areas where you may not drop the standard.

You can also make copies of junction standards within junction standard files in the same way; in this case the name of the standard is prefixed with the words 'Copy of ', to distinguish it from the original.

---

## Unlocking a junction standard file (Unlock Junction Standard File dialog) <sup>(3555)</sup>

1. Highlight the junction standard file that you want to unlock, right click and select **Unlock Junction Standard File** from the drop down menu that appears. If a password has been set for the standard file, the Unlock Junction Standard File dialog will appear. Otherwise, the standard file will be unlocked and you should refer to step 3.



Unlock Junction Standard File dialog

2. Enter your **User Name** and **Password** and click **OK**.
3. You will be granted whatever rights you have within the standard file. Thus, if you have full access rights within the current standard file then you will be able to change values in the unlocked standards; if, on the other hand you only have read only rights then you will only be able to use and copy the standards.

---

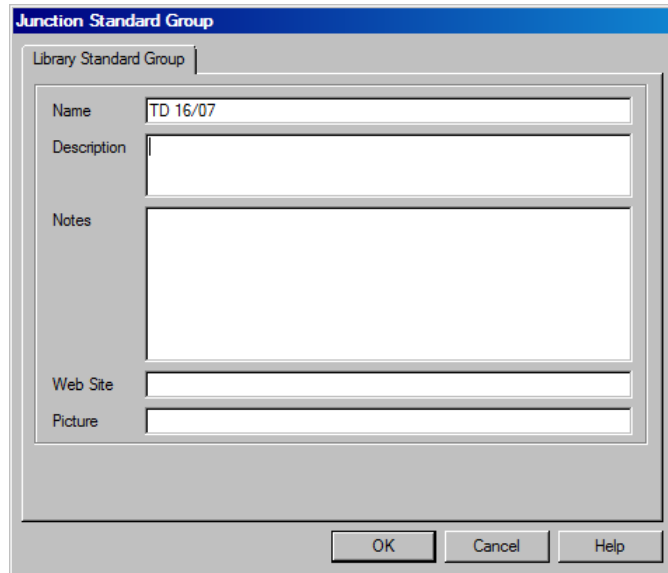
## Creating a new group

1. Select **Junction Standard Explorer** from the AutoTrack, Junctions menu or click the **Junction Standard Explorer** button on the AutoTrack toolbar. The Junction Standard Explorer will appear.
2. Highlight the junction standard file that you want to add a group to.
3. Right click and select **New, Junction Standard Group** from the menu. The [Parking Standard Group dialog](#) will appear.
4. Edit the details and click **OK** to confirm.

---

## Junctions Standard Group dialog <sup>(4670)</sup>

1. The Junction Standard Group dialog lists the junction standard group details.



Junction Standard Group dialog

2. Edit the **Name** and click **OK** to confirm.

---

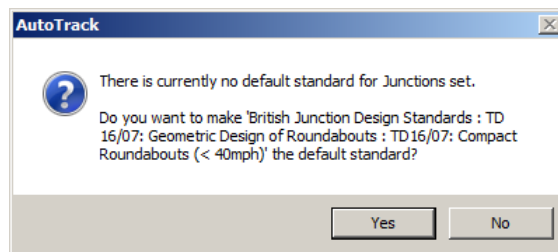
## Selecting a Junction Standard

### To set a default junction standard

1. Highlight the junction standard that you want to set as your default and click the **Make Default** button.
2. The next time you place a junction this standard will be used.

### Default Junction Standard dialog <sup>(4690)</sup>

1. AutoTrack allows you to define a default junction standard, i.e. a standard that will be used every time you place a junction unless you actively select an alternative. This can be very useful if you regularly use the same standard. If you select a standard to use and you do not have a default standard set the Default Junction Standard dialog will appear.



Default Junction Standard dialog

2. If you select **Yes** then this standard will be selected automatically next time you place a junction. If you select **No** then you will be asked this again the next time you select a standard in similar circumstances.

---

## Viewing or editing junction standards

Junction standards supplied by Savoy can only be edited once they have been selected for a project. Then, any changes you make to the standard will affect the junction that uses it.

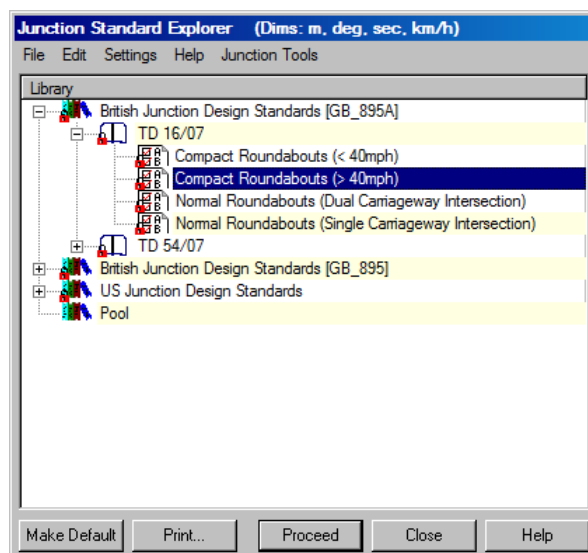
You may edit junction standards that you create. However, in order to prevent accidental changes, they will be locked when you close AutoTrack and you will need to unlock them to make any changes.

### To edit a junction standard



*Junction Standard Explorer button*

1. Select **Junction Standard Explorer** from the AutoTrack, Junctions menu or click the **Junction Standard Explorer** button on the AutoTrack Junctions toolbar. The Junction Standard Explorer dialog will appear.

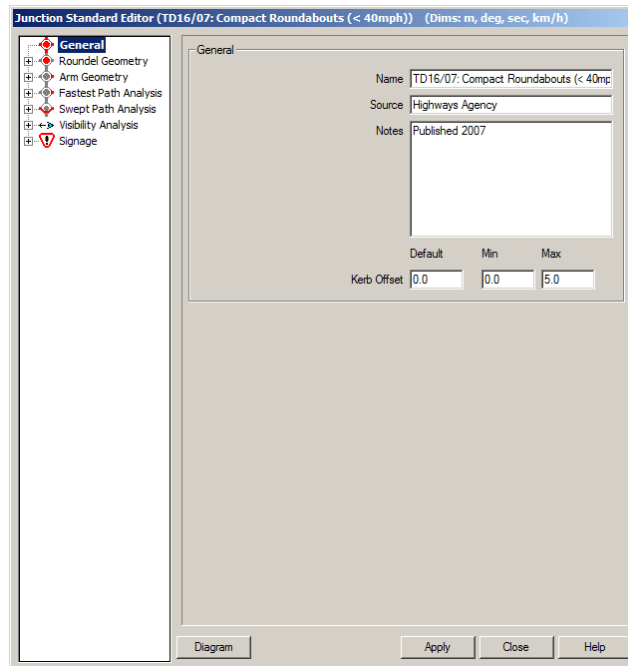


Junction Standard Explorer dialog

2. If the standard file that you require is not loaded then select **Open Junction Standard** from the **File** menu in the Junction Standard Explorer, browse to find the standard file and click **Open**. A new junction standard icon will appear in the Junction Standard Explorer with the name of the standard file beside it.
3. Click on the + symbol to expand the standard file or the pool.
4. Click the + symbol adjacent to the required group if necessary.
5. To edit or view a standard (indicated by a check sheet icon) highlight it and select **Edit** (or **View** if the Standard is locked) from the Edit menu. To make a copy of a standard select **Edit a Copy** instead. The Junction Standard Editor dialog will appear.
6. If you wish to edit a junction standard group then highlight it and select **Edit** (or **View** if the standard file is locked) from the **Edit** menu in the Junction Standard Explorer. The Junction Standard Group dialog will appear.
7. To create a new junction standard highlight the parent file or group, right click and select **New Junction Standard** from the menu that appears.

## Junction Standard Editor<sup>0</sup>

The Junction Standard Editor is basically a tabbed dialog. The left hand pane displays a tree view of the pages available and the right hand pane shows the selected page.



Junction Standard Editor

1. Click the + symbol against the tree items in the left hand pane to expand the tree and see the available pages. They are grouped to assist you to find what you need.
2. Click on a page heading in the left hand pane to display the page on the right.
3. Click **Diagram** to display a window containing context sensitive diagrams that change with the current selected field.
4. Click **Apply** to save all changes made to the current and other pages. If you close without applying your changes will be discarded.
5. In each of the pages, where they are present, the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value MUST be provided but Max and Min may be blank if there is no limiting value.

## Junction Standard Editor: General (8490)

1. Click on the **General** tab.

The screenshot shows the 'Junction Standard Editor (TD16/07: Compact Roundabouts (< 40mph))' window. The 'General' tab is selected in the left-hand tree view. The main panel contains the following fields:

- Name:** TD16/07: Compact Roundabouts (< 40mp
- Source:** Highways Agency
- Notes:** Published 2007
- Kerb Offset:** A table with three columns: Default, Min, and Max. The values are 0.0, 0.0, and 5.0 respectively.

At the bottom of the window are buttons for 'Diagram', 'Apply', 'Close', and 'Help'.

Junctions Standard Editor: General tab

2. The **Name**, **Source** and **Notes** allow you to specify the standard. Even though these fields are not compulsory we nevertheless recommend that you complete them since they are useful reminders when you come to reuse the standard at a later date.
3. The nearside kerb is assumed by default to coincide with the nearside definition line. However, you may set a non-zero **Kerb Offset** if you wish. The value applies to the nearside kerb on all arms and where it passes around the roundel.
4. The **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value **MUST** be provided but Max and Min may be blank if there is no limiting value.

## Junction Standard Editor: Roundel Geometry: Central Island <sup>(8500)</sup>

1. Expand **Roundel Geometry** and click on the **Central Island** tab.

	Default	Min	Max
Inscribed Circle Diameter	36.0	28.0	36.0
Centre Island Diameter	16.0	4.0	32.0
Apron Diameter	8.0	4.0	30.0
Apron Width	1.0	0.0	20.0

Junction Standard Editor: Roundel Geometry: Central Island

2. The **Inscribed Circle Diameter** is the diameter of the definition line that represents the outer limit of the roundabout. Note that if a kerb offset has been defined then the actual kerb will not coincide with the definition line.
3. The **Centre Island Diameter** is the diameter of the island around which the vehicles turn. It does NOT include the apron or overrun area.
4. The **Apron Diameter** is the diameter of the overrun area. This is the offside limit of turning for normal vehicles.

### Note

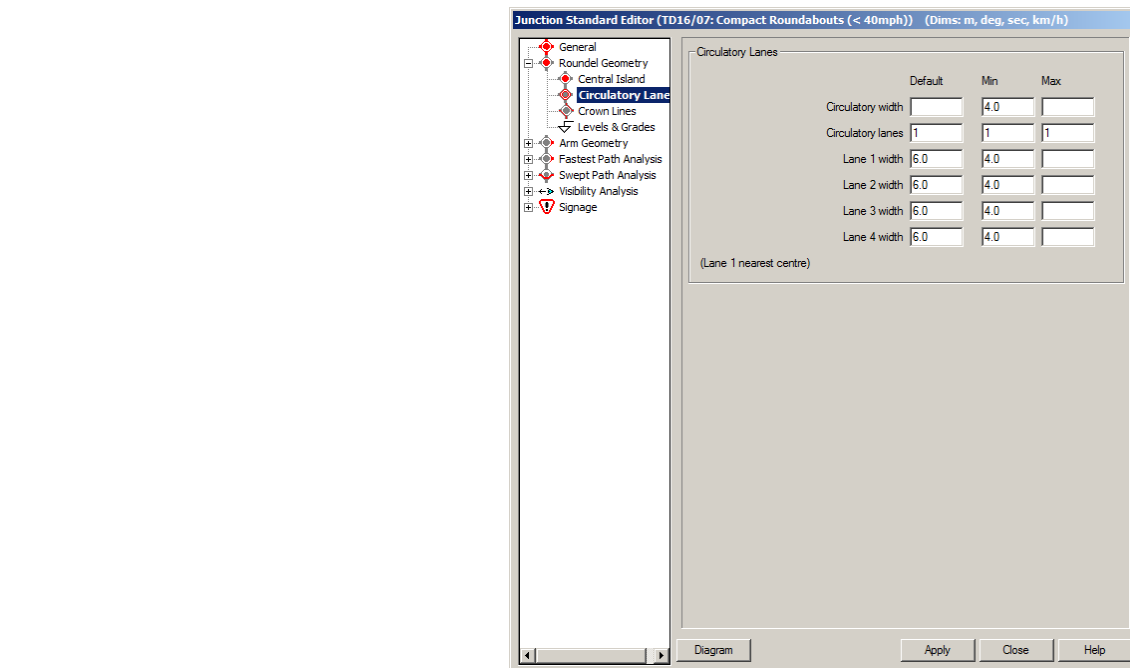
*The apron is regarded as falling outside the central island.*

5. The **Apron Width** is the width of the vehicle overrun area. It is **Apron Diameter** minus the **Centre Island Diameter** divided by 2.
6. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value MUST be provided but Max and Min may be blank if there is no limiting value.



## Junction Standard Editor: Roundel Geometry: Circulatory Lanes <sup>(8510)</sup>

1. Expand **Roundel Geometry** and click on the **Circulatory Lanes** tab.



Junction Standard Editor: Circulatory Lanes

2. The **Circulatory Width** is the width of the entire circulatory path measured between the island radius (or the apron radius if smaller) and the inscribed circle radius.
3. The **Circulatory Lanes** is the number of designated lanes around the central island. There would normally be at least the same number of circulatory lanes as there are lanes on any of the incoming arms.
4. The **Lane Width** is measured between definition lines and/or lane separator line.

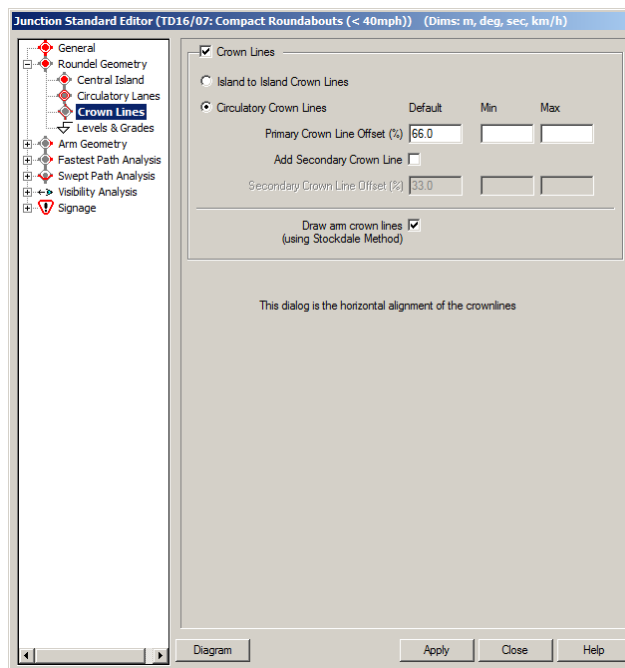
### Note

*Lane 1 is nearest the central island.*

5. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value **MUST** be provided but Max and Min may be blank if there is no limiting value.

## Junction Standard Editor: Roundel Geometry: Crown Lines <sup>(8575)</sup>

1. Expand **Roundel Geometry** and click on the **Crown Lines** tab.



Junction Standard Editor: Roundel Geometry: Crown Lines

2. Tick **Crown Lines** to create crown lines automatically when the roundabout is placed. If this is not ticked then if you later add crown lines via the Junction Properties dialog they will be regarded as an audit exception.
3. There are two regions that may have crown lines; the approach roads (the arms) and the circulatory area. The approach road crown lines are defined on the Approach tab.
4. Within the circulatory area there are two types of crown lines that may be created; Island to Island or Circulatory.

**Island to Island Crown Lines** are straight lines connecting the approach splitter island corner at the ICD with the exit splitter island corner on the next exit.

**Circulatory Crown Lines** are concentric circles within the circulatory area.

5. The **Primary Crown Line Offset** is the distance of the crown line from the centre island measured as a percentage of the circulatory width so a value of 0% would define a crown line at the centre island and a value of 100% would define a crown line on the ICD.
6. If you want to define two crown lines on your circulatory area tick **Add Secondary Crown Line** and edit the **Secondary Crown Line Offset** if necessary.
7. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value MUST

be provided but Max and Min may be blank if there is no limiting value.

## Junction Standard Editor: Roundel Geometry: Levels & Grades <sup>(8515)</sup>

This page lets you define preferred slopes and crossfalls on the roundel.

1. Expand **Roundel Geometry** and click on the **Levels & Grades** tab.

Junction Standard Editor (TD16/07: Compact Roundabouts (< 40mph)) (Dims: m, deg, sec, km/h)

General  
Roundel Geometry  
Central Island  
Circulatory Lanes  
Crown Lines  
**Levels & Grades**  
Arm Geometry  
Fastest Path Analysis  
Swept Path Analysis  
Visibility Analysis  
Signage

Levels

Has Overall Crossfall (Tilted Plane) ☐

	Default	Min	Max
Overall Crossfall (%)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Apron Crossfall (%)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Apron To Crown Crossfall (%)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Inter-Crown Crossfall (%)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Crown To ICD Crossfall (%)	<input type="text"/>	<input type="text"/>	<input type="text"/>

Diagram Apply Close Help

Junction Standard Editor: Roundel Geometry: Levels & Grades

2. To ensure that the roundabout is constructed on a tilted plane for drainage tick **Has Overall Crossfall**. Falls between crown lines are added to the overall tilted plane slope.
3. If a tilted plane is specified then enter the **Overall Crossfall**.
4. Enter the cross fall in each region of the circulatory area, in all cases a positive fall is downwards and from inner to outer 'edge'.

## Junction Standard Editor: Arm Geometry: Approach <sup>(8520)</sup>

1. Expand **Arm Geometry** and click on the **Approach** tab.

Junction Standard Editor (TD16/07: Compact Roundabouts (< 40mph)) (Dims: m, deg, sec, km/h)

Approach Road

	Default	Min	Max
Design Speed	48.28	48.28	64.374
Central Gap Width	0.0	0.0	
Approaching:			
Lanes	1	0	1
Lane Width	3.5	2.0	4.0
Crown Line Start Offset			
Crown Line Offset at Entry (%)			
Departing:			
Lanes	1	0	1
Lane Width	3.5	2.0	4.0
Crown Line Start Offset			
Crown Line Offset at Entry (%)			

Diagram Apply Close Help

Junction Standard Editor: Arm Geometry: Approach

2. The **Design Speed** is the design speed of the section of road leading up to the roundabout.
3. The **Central Gap Width** is the distance between the offside definition lines of the approaching lanes and the departing lanes.
4. The **Approaching Lanes** is the number of lanes of traffic approaching the roundabout and would normally be less than or equal to the number of circulatory lanes.
5. The **Approaching Lane Width** is measured between definition lines. On a road with no centre gap the offside definition line is the centreline.
6. The **Approaching Crown Line Start Offset** is the distance back from the ICD at which the crown line starts to deviate from the approaching lanes offside definition line.
7. The **Approaching Crown Line Offset at Entry** defines the position of the crown line at entry to the roundabout. It is measured as a percentage of the entry width from the offside definition line so 0% would be on the offside definition line and 100% would be on the nearside definition line.
8. The **Departing Lanes** the number of lanes leaving the roundabout onto this road.
9. The **Departing Lane Width** is measured between definition lines. On a road with no centre gap the offside definition line is the centreline.
10. The **Departing Crown Line Start Offset** is the distance back from the ICD at which the crown line starts to deviate from the departing lanes offside definition line.

11. The **Departing Crown Line Offset at Exit** defines the position of the crown line at exit from the roundabout. It is measured as a percentage of the exit width from the offside definition line so 0% would be on the offside definition line and 100% would be on the nearside definition line.
12. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value **MUST** be provided but Max and Min may be blank if there is no limiting value.

## Junction Standard Editor: Arm Geometry: Entry (8540)

1. Expand **Arm Geometry** and click on the **Entry** tab.

	Default	Min	Max
Design Speed	48.28	48.28	64.374
Entry Lanes	1	0	1
Lane Width (Single)	4.5	3.0	4.5
Lane Width (Multiple)	3.5	3.0	3.5
Entry Width (Overall)	4.5	3.0	20.0
Splitter Radius	70.0	0.0	100.0
Nearside Radius	40.0	10.0	70.0
Inter-Arm Radius	50.0	0.0	100.0
Additional Lane Length	0.0	0.0	200.0
Taper Lane Length	20.0	5.0	100.0
Flare Lane Width	2.5	2.5	3.5

Junction Standard Editor: Arm Geometry: Entry

2. The **Vehicle Speed** is the speed at the yield line.
3. **Entry Lanes** refers to the number of designated lanes at the entry point.
4. The **Entry Lane Width (Single)** refers to the permitted lane width when there is only a single lane at entry. This is measured between the nearside and offside definition lines.
5. The **Entry Lane Width (Multiple)** refers to the permitted lane width when there is more than one lane at entry. This is measured between lane separator lines or between lane separator lines and definition lines in the case of the nearside and offside lanes.
6. The **Entry Width (Overall)** is the permitted overall entry width at entry. It is measured perpendicular to the splitter definition line at the intersection of the splitter definition line and the inscribed circle and is the distance between the splitter definition line and the nearside definition line.
7. The **Splitter Radius** is the radius of the offside definition line at the splitter.
8. The **Nearside Radius** is the radius of the nearside definition line at the splitter.
9. The **Inter-Arm radius** is the radius between the current arm and the next arm. Note that this is used to connect the nearside definition lines of two adjacent arms if the lines do not intersect on the Inscribed Circle.
10. The **Additional Lane Length** is measured from the yield line where it intersects the splitter line.

11. The **Taper Lane Length** is the distance over which the entry road width changes as it adjusts to accommodate the additional lane. This is normally a significant positive value to avoid a severe step in the nearside definition line.
12. The **Flare Lane Width** is the permitted width of any extra lanes and determines when extra lane markings start.
13. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value **MUST** be provided but Max and Min may be blank if there is no limiting value.



## Junction Standard Editor: Arm Geometry: Exit (8550)

1. Expand **Arm Geometry** and click on the **Exit** tab.

Junction Standard Editor (TD16/07: Compact Roundabouts (< 40mph)) (Dims: m, deg, sec, km/h)

	Default	Min	Max
Design Speed	48.28	48.28	64.374
Exit Lanes	1	0	1
Lane Width (Single)	4.5	3.0	4.5
Lane Width (Multiple)	3.5	3.0	3.5
Exit Width (Overall)	4.5	3.0	20.0
Splitter Radius	100.0	0.0	100.0
Nearside Radius	20.0	15.0	20.0

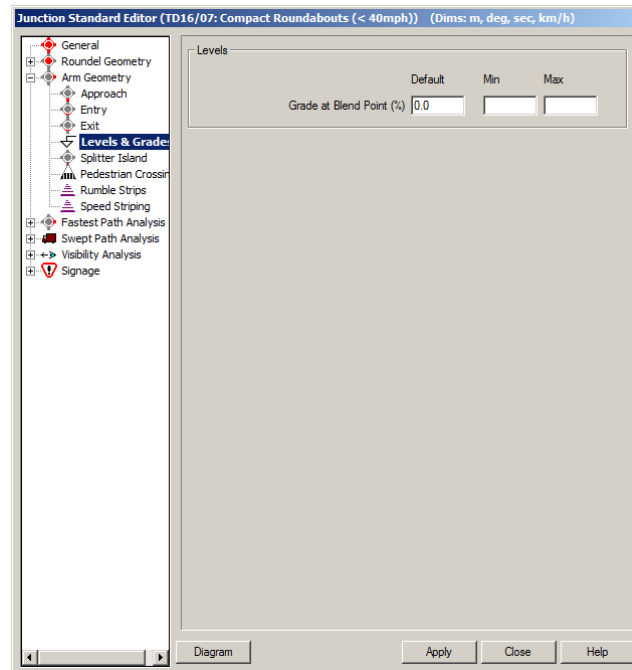
Diagram Apply Close Help

Junction Standard Editor: Arm Geometry: Exit

2. The **Design Speed** is the speed at the intersection of the exit splitter and the inscribed circle.
3. **Exit Lanes** refers to the number of designated lanes at the exit point.
4. The **Exit Lane Width (Single)** refers to the permitted lane width when there is only a single lane at the exit. This is measured between the nearside and offside definition lines.
5. The **Exit Lane Width (Multiple)** refers to the permitted lane width when there is more than one lane at the exit. This is measured between lane separator lines or between lane separator lines and definition lines in the case of the nearside and offside lanes.
6. The **Exit Width (Overall)** is the permitted overall width of the roadway at the exit point. It is measured perpendicular to the splitter definition line at the intersection of the splitter definition line and the inscribed circle and is the distance between the splitter definition line and the nearside definition line.
7. The **Splitter Radius** is the radius of the offside definition line at the splitter.
8. The **Nearside Radius** is the radius of the nearside definition line at the splitter.
9. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value **MUST** be provided but Max and Min may be blank if there is no limiting value.

## Junction Standard Editor: Arm Geometry: Levels & Grades <sup>(8555)</sup>

1. Expand **Arm Geometry** and click on the **Levels & Grades** tab.



Junction Standard Editor: Arm Geometry: Levels & Grades

2. The **Grade at Blend Point** (longitudinal) would normally be taken from the existing road surface. However, if the roundabout design requires that the existing surface levels at the blend point change, you may define a default gradient and limiting values which Junctions will use in its audit checks.
3. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value **MUST** be provided but Max and Min may be blank if there is no limiting value.

## Junction Standard Editor: Arm Geometry: Splitter Island <sup>(8570)</sup>

1. Expand **Arm Geometry** and click on the **Splitter Island** tab.

Junction Standard Editor (TD16/07: Compact Roundabouts (< 40mph)) (Dims: m, deg, sec, km/h)

**Splitter Island**

	Default	Min	Max
Island Length			
<b>Entry Kerb Line</b>			
Kerb Radius	0.0	0.0	100.0
Inner Offset	0.3	0.0	5.0
Outer Offset	0.3	0.0	5.0
<b>Exit Kerb Line</b>			
Kerb Radius	0.0	0.0	100.0
Inner Offset	0.3	0.0	5.0
Outer Offset	0.3	0.0	5.0
<b>Roundabout Kerb Line</b>			
Kerb Radius	0.0	0.0	100.0
Entry Offset	0.3	0.0	5.0
Exit Offset	0.3	0.0	5.0
<b>Fillet Radii</b>			
Entry Fillet Radius	0.5	0.0	5.0
Exit Fillet Radius	0.5	0.0	5.0
Approach Fillet Radius	0.5	0.0	5.0

Diagram Apply Close Help

Junction Standard Editor: Arm Geometry: Splitter Island

2. The splitter island page is divided into three identical areas that relate to each of the three sides of the splitter island and a fourth that relates to the fillet radii.
3. The **Island Length** is the length of the splitter island from the point at which the approach centreline intersects the ICD to the approach fillet radius.
4. The **Kerb Radius** is set by default to **Tracking**. This means that it is offset from the splitter definition line and that the offset changes linearly from the inner offset to the outer offset. If you wish to specify a fixed default radius then enter a value.

### Note

*If the end offsets are equal then the kerb radius is a circular arc concentric with the splitter definition line.*

5. The **Inner Offset** is the distance by which the splitter island is offset from the splitter definition line at the end closest to the centre of the roundabout.
6. The **Outer Offset** is the distance by which the splitter island is offset from the splitter definition line at the end furthest from the centre of the roundabout.
7. The **Entry Offset** and **Exit Offset** on the Roundabout Kerb Line section are the distances by which the splitter island is offset from the inscribed circle at the entry and exit ends respectively.
8. The **Entry Fillet Radius** is the radius of the fillet at the intersection of the entry kerb line and the roundabout kerb line.
9. The **Exit Fillet Radius** is the radius of the fillet at the intersection of the exit kerb line and the roundabout kerb line.

10. The **Approach Fillet Radius** is the radius of the fillet at the intersection of the entry and exit kerb lines.

**Note**

*If the approach road has a central gap and the sum of the outer offsets at entry and exit is less than the central gap width then the island approach fillet will be omitted and the splitter island kerb lines will be continued to form a central reservation.*

11. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value **MUST** be provided but Max and Min may be blank if there is no limiting value.

## Junction Standard Editor: Arm Geometry: Pedestrian Crossing <sup>(8530)</sup>

1. Expand **Arm Geometry** and click on the **Pedestrian Crossing** tab.

Junction Standard Editor (TD16/07: Compact Roundabouts (< 40mph)) (Dims: m, deg, sec, km/h)

	Default	Min	Max
Offset From Intersect	10.0	0.0	
Crossing Width	2.4	2.4	5.0
Angular Displacement	0	-45	45

	Default	Min	Max
Kerb offset	0.2	0.0	
Refuge width	2.4	1.0	

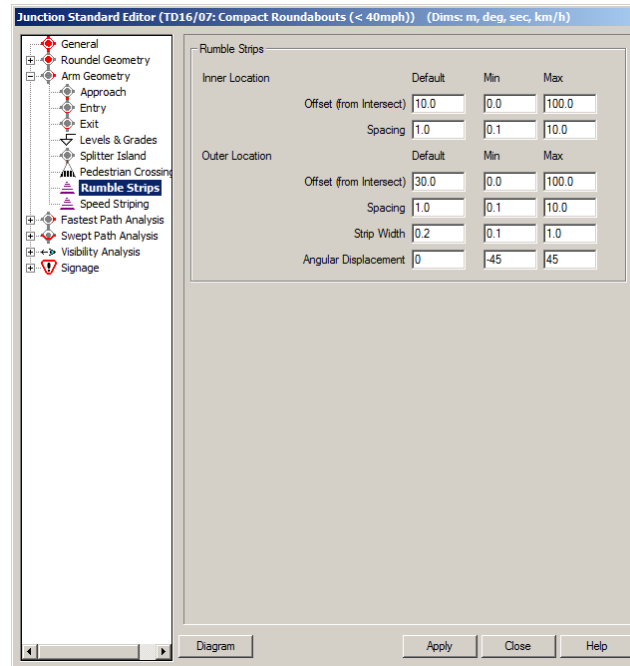
Diagram Apply Close Help

Junction Standard Editor: Arm Geometry: Pedestrian Crossing

2. The **Pedestrian Crossing** frame controls the appearance of the crossing over the road.
3. The **Offset from Intersect** is measured along the splitter definition line from the intersection of that line and the inscribed circle.
4. The **Crossing Width** is measured perpendicular to the angle of the crossing.
5. The **Crossing Angle** is measured relative to a line perpendicular to the splitter definition line. Rotation is positive when the crossing is turned away from the roundabout. In most cases the angle will be zero since this represents the shortest crossing distance.
6. The **Island Crossing** controls the appearance of the crossing over the island.
7. The **Island Crossing Kerb Offset** is the offset of the kerb from the edge of the crossing.
8. The **Refuge Width** applies only to Refuge type crossings. It is the width of the crossing on the section approximately parallel to the approach road.
9. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value **MUST** be provided but Max and Min may be blank if there is no limiting value.

## Junction Standard Editor: Arm Geometry: Rumble Strips <sup>(8580)</sup>

1. Expand **Arm Geometry** and click on the **Rumble Strips** tab.

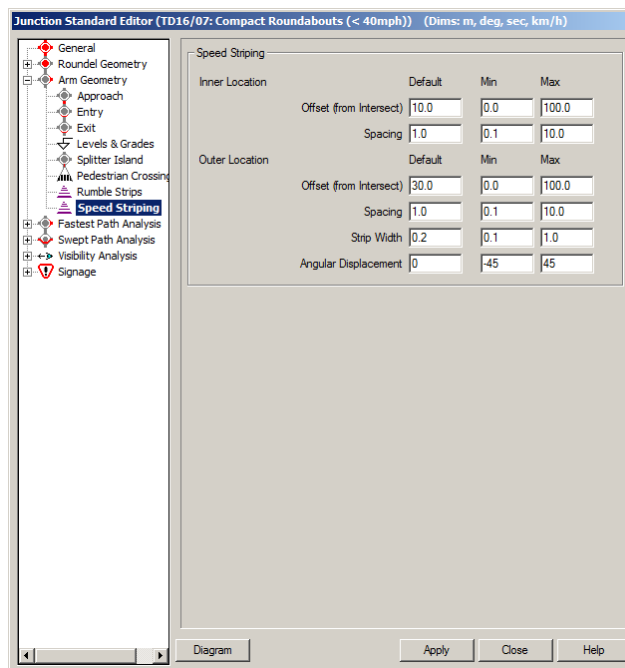


Junction Standard Editor: Arm Geometry: Rumble Strips

2. Rumble strips start at the **Outer Offset from Entry Intersect** (furthest from the roundabout) and end closer to the roundabout at the **Inner Offset from Entry Intersect**. Both are measured along the offside (or splitter) definition line from the intersection of that line and the inscribed circle .
3. The **Outer Strip Spacing** is often wider than the **Inner Strip Spacing**.
4. The **Strip Width** is measured perpendicular to the strip and does not vary.
5. The **Strip Angle** is measured relative to the normal to the offside definition line. Rotation is positive when the strips are turned away from the roundabout.
6. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value **MUST** be provided but Max and Min may be blank if there is no limiting value.

## Junction Standard Editor: Arm Geometry: Speed Striping<sup>(8580)</sup>

1. Expand **Arm Geometry** and click on the **Speed Striping** tab.



Junction Standard Editor: Arm Geometry: Speed Striping

2. Speed strips start at the **Outer Offset from Entry Intersect** (furthest from the roundabout) and end closer to the roundabout at the **Inner Offset from Entry Intersect**. Both are measured along the offside (or splitter) definition line from the intersection of that line and the inscribed circle.
3. The **Outer Strip Spacing** is often wider than the **Inner Strip Spacing**.
4. The **Strip Width** is measured perpendicular to the strip and does not vary.
5. The **Strip Angle** is measured relative to the normal to the offside definition line. Rotation is positive when the strips are turned away from the roundabout.
6. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value **MUST** be provided but Max and Min may be blank if there is no limiting value.

## Junction Standard Editor: Fastest Path Analysis: Fastest Path Calculation <sup>(8595)</sup>

One of the factors used to assess the safety of a roundabout is the maximum realistic speed of a notional vehicle on the most direct line (the fastest line) through the roundabout. This is known as the fastest line speed. To calculate the fastest line speed, Junctions first calculates the required alignment and then steps along it testing for the smallest radius. The smaller the radius, the slower the speed. The speed is calculated using the following equation:-

$$V^2 = 127R(e+f)$$

Where:-

**R** is Turn Radius

**V** is Speed

**e** is Super-elevation (assumed to be 0.0)

**f** is Side Friction Factor (adjusted for speed)

1. Expand **Fastest Path Analysis** and click **Fastest Path Calculation** in the left hand pane. The Fastest Path Calculation page will appear.

	Default	Min	Max
Start Distance From Yield Line	50.0	50.0	50.0
Start Centreline Offset	1.0	1.0	
Entry Offset	1.0	1.0	
Island Offset	1.0	1.0	
Exit Offset	1.0	1.0	
End Centreline Offset	1.0	1.0	
End Distance From Exit Line	50.0	50.0	50.0
Radius Calculation Length	25.0	25.0	25.0
Offset Path From	Apron / Kerb Lines		

Diagram Apply Close Help

Junction Standard Editor: Fastest Path Analysis: Fastest Path Calculation

2. The method by which the fastest line is calculated varies and differing methods often give different answers. The settings on this page let you adjust how the calculation is done.
3. The following offsets may be measured from definition lines or kerb lines and from island or apron. Use the **Offset Path From** drop down list to select the required method.
4. The **Start Distance from Yield Line** is the straight line distance from the inscribed circle to the front axle of the test vehicle.



5. The **Start Centreline Offset** is the minimum offset from the nearside or offside kerbs or definition lines.
6. The **Entry Offset** is the minimum offset of the centreline of the vehicle from the nearside entry kerb or definition line.
7. The **Island Offset** is the minimum offset of the centreline of the vehicle from the island or apron.
8. The **Exit Offset** is the minimum offset of the centreline of the vehicle from the nearside exit kerb or definition line.
9. The **End Centreline Offset** is the minimum offset from the nearside or offside kerbs or definition lines.
10. The **End Distance from Yield Line** is the straight line distance from the inscribed circle to the front axle of the test vehicle.
11. The **Radius Calculation Length** is the length over which the radius should be tested. Junctions calculates the radius of a 3-point arc of this length along the fastest line using the start, middle and end points.
12. The fastest line and speed are calculated continuously and optionally displayed in the HUD or Junction Report.
13. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value **MUST** be provided but Max and Min may be blank if there is no limiting value.

## Junction Standard Editor: Fastest Path Analysis: Vehicle Paths <sup>(8597)</sup>

The roundabout must be capable of accommodating appropriate vehicles. This tab allows the user to define design vehicles.

1. Expand **Fastest Path Analysis** and click **Vehicle Paths** in the left hand pane. The Vehicle Paths page will appear.

	Warn %	Min	Max
Entry Path Radius (R1)			70.0
Circulating Path Radius (R2)			
Exit Path Radius (R3)			
270 Deg Turn Path Radius (R4)	15		
90 Deg Turn Path Radius (R5)	15		
Fastest Path Radius			

	Warn %	Min	Max
Entry Path Speed (V1)			112.654
Circulating Path Speed (V2)			112.654
Exit Path Speed (V3)			112.654
270 Deg Turn Path Speed (V4)	15		112.654
90 Deg Turn Path Speed (V5)	15		112.654
Fastest Path Speed			112.654

Junction Standard Editor: Fastest Path Analysis: Vehicle Paths

2. The **Vehicle Path Radii** frame displays the limiting radii at critical points on the roundabout and lets you define proximity warnings. As soon as the value in the HUD gets to within **Warn %** of the limiting value (max or min) it is displayed in orange. When it is less than the **Min** value or greater than the **Max** value it is displayed in red.
3. The **Entry Path Radius** is the radius of the path taken by the centre of the front axle of the vehicle at entry to the roundabout, i.e. at or about the yield line.
4. The **Circulating Path Radius** is the radius of the nominally through path as it negotiates the centre island.
5. The **Exit Path Radius** is the radius of the path taken by the centre of the front axle of the vehicle at exit from the roundabout, i.e. at or about the exit line.
6. The **270 Degree Turn Path Radius** is the radius of the path taken by the front axle of the vehicle as it performs a 270 degree turn. In fact this value is calculated for turn angle between 255 and 285 degrees.
7. The **90 Degree Turn Path Radius** is the radius of the path taken by the front axle of the vehicle as it performs a 90 degree turn. In fact this value is calculated for turn angle between 45 and 135 degrees.
8. The **Fastest Path Radius** is the minimum radius on the fastest path through the roundabout.

9. The **Vehicle Path Speeds** frame displays the limiting speeds at critical points on the roundabout and lets you define proximity warnings. As with the radii, as soon as the value in the HUD gets to within **Warn %** of the limiting value (max or min) it is displayed in orange.
10. The **Entry Path Speed** is the speed that equates to the radius of the path taken by the centre of the front axle of the vehicle at entry to the roundabout, i.e. at or about the yield line.
11. The **Circulating Path Speed** is the speed that equates to the radius of the nominally through path as it negotiates the centre island.
12. The **Exit Path Speed** is the speed that equates to the radius of the path taken by the centre of the front axle of the vehicle at exit from the roundabout, i.e. at or about the exit line.
13. The **270 Degree Turn Path Speed** is the speed that equates to the radius of the path taken by the front axle of the vehicle as it performs a 270 degree turn. In fact this value is calculated for turn angle between 255 and 285 degrees.
14. The **90 Degree Turn Path Speed** is the speed that equates to the radius of the path taken by the front axle of the vehicle as it performs a 90 degree turn. In fact this value is calculated for turn angle between 45 and 135 degrees.
15. The **Fastest Path Speed** is the speed that equates to the minimum radius on the fastest path through the roundabout.

#### **Note**

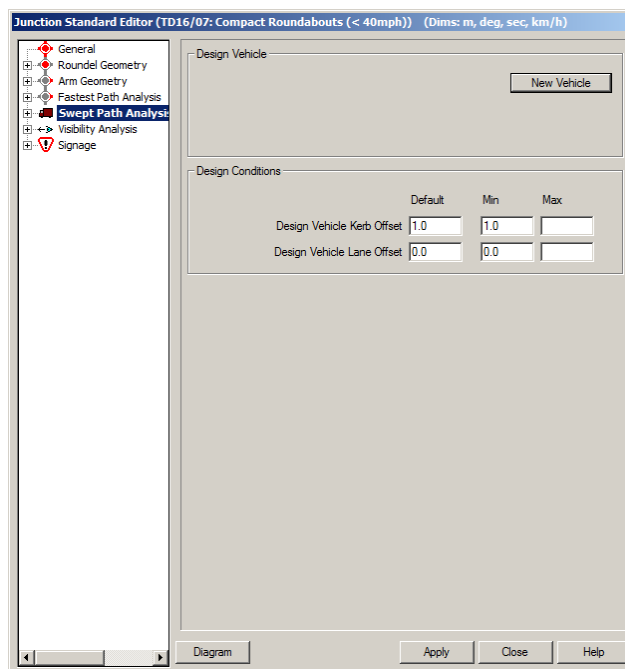
*Where the standard does not specify a limiting radius or speed we have inserted the national or state speed limit so that the HUD's have a limit against which to scale these critical design values. We have not used lower local speed limits because this could cause valid large radii (for example on roundabout exits) to display in red as excessive.*

16. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value **MUST** be provided but Max and Min may be blank if there is no limiting value.

## Junction Standard Editor: Swept Path Analysis (8910)

This page allows you to define design vehicles for which the roundabout circulatory area will be checked.

1. Click on **Swept Path Analysis** in the left hand pane. The Swept Path Analysis page will appear.



Junction Standard Editor: Swept Path Analysis

1. Expand **Swept Path Analysis** in the left hand pane to see currently defined design vehicles. Select a vehicle to see its details in the right hand pane.
2. Click **New Vehicle** in the Design Vehicle frame to create a new design vehicle. The Design Vehicle dialog will appear.
3. The **Design Criteria** frame lets you specify the offsets from kerb and lane markings.
4. The **Vehicle Path Clearance** is the minimum distance between the inscribed circle kerb and the outer body envelope of the design vehicle turning in steady state around the roundabout. This value is used by Junctions, in conjunction with the design vehicle critical dimensions, solely to calculate the minimum circulatory width required. It is not used to limit the placement of actual paths on the roundabout.
5. The **Separator Line Path Offset** is the minimum distance between the circulatory lane markings and the outer body envelope of the design vehicle turning in steady state around the roundabout.
6. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value **MUST** be provided but Max and Min may be blank if there is no limiting value.

## Junction Standard Editor: Swept Path Analysis: Design Vehicle <sup>(8915)</sup>

The roundabout must be capable of accommodating appropriate vehicles. This tab allows the user to edit or delete existing design vehicles.

1. Expand **Swept Path Analysis** and select a vehicle in the left hand pane. The Design Vehicle page will appear.

Junction Standard Editor (TD16/07: Compact Roundabouts (< 40mph)) (Dims: m, deg, sec, km/h)

Design Vehicle

Name: TRRL 662 Articulated Combination

Type:

Overall Width: 2.55

Effective Front Overhang: 1.25

Effective Rear Overhang: 1.15

Tractor Effective Wheelbase: 3.5

Trailer Effective Wheelbase: 10.5

Effective Kingpin Offset: -0.9

Drawbar Length: 0.0

Select... Delete

Diagram Apply Close Help

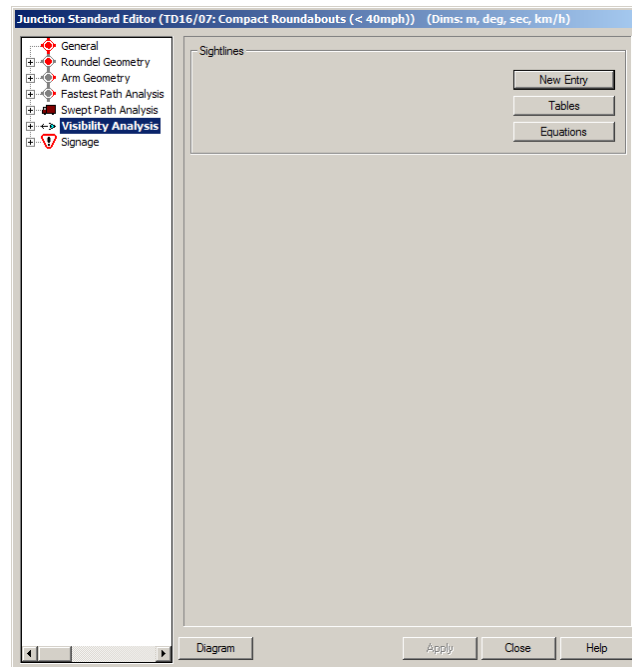
Junction Standard Editor: Swept Path Analysis: Design Vehicle

2. The design vehicle **Overall Width** is the width of the design vehicle at its widest point.
3. The design vehicle **Effective Front Overhang** is the distance from the effective front axle to the front-most point on the body.
4. The design vehicle **Effective Rear Overhang** is the distance from the effective rear axle to the rear-most point on the body.
5. The design vehicle **Tractor Effective Wheelbase** is the distance between the effective front and rear tractor axles.
6. The design vehicle **Trailer Effective Wheelbase** is the distance between the trailer effective front and rear axles or between the kingpin and the effective rear axle.
7. The design vehicle **Effective Kingpin Offset** is the distance from the effective rear axle back to the kingpin. If the kingpin is in front of the effective rear axle then the distance is negative.
8. The design vehicle **Drawbar Length** is the length of the drawbar (if any) between pivot points.
9. In all cases the **Max** and **Min** values represent the limiting values from the adopted design standard and the **Default** value will be used when the roundabout is first placed. A default value **MUST** be provided but Max and Min may be blank if there is no limiting value.

## Junction Standard Editor: Visibility Analysis <sup>(8900)</sup>

You may define any number of visibility sightlines based upon pre-defined types. The sightlines may optionally use user-definable data tables or pre-defined equations, some of which have user-definable parameters. All active sightlines defined in the standard are created automatically when you place a roundabout. Thereafter they may be individually switched on or off to facilitate easy analysis.

1. Click **Visibility Analysis** in the left hand pane. The Visibility Analysis page will appear.



Junction Standard Editor: Visibility Analysis

2. There are a number of sightline types available, not all of which are appropriate to all national standards. They include the following:-
  - Approach Stopping Sight Distance
  - Forward Circulatory Visibility on Approach
  - Backward Circulatory Visibility on Approach
  - Circulatory Visibility
  - Next Exit Crossing Visibility on Approach
  - Previous Entry Visibility on Approach
  - Crossing Visibility on Approach
3. We recommend that if the sightline changes or additions you wish to make require new tables or equations then these should be created first.
4. If you have some sightlines already defined then you may click the [+] next to Visibility Analysis in the left hand pane to expand the list.
5. Click **New Entry** to create a new sightline.
6. Click **Tables** to create or edit a data table.
7. Click **Equations** to create or edit an equation.

## Junction Standard Editor: Visibility Analysis: Sightline<sup>(8905)</sup>

Each visibility sightline is defined in a separate page.

1. Click the **New Entry** button on the Visibility page or select the required sightline from the expanded list. The Sightline page or dialog will appear.

Junction Standard Editor: Visibility Analysis: Sightline

2. Select a sightline **Type** from the dropdown list.
3. Enter a **Name** for the sightline. Typically, this might be the same as the type. This is what will appear in the Junction Properties for you to select.

### Warning

*Visibility sightlines names (which generally match the names given in the standard for a particular jurisdiction) may be misleading if used on roundabouts in a different jurisdiction. For example, a UK sightline that refers to 'vehicles entering from the right' will actually be displayed on a US roundabout to the left.*

4. Enter the **Visibility Distance** which may be a fixed distance but is more likely to be based upon vehicle speed and may be defined in a table depending upon the standard.

If the visibility distance is fixed then select **Fixed Distance** and type the value in the edit field provided.

If the distance is listed in a table then select **Based on Table** and click the [...] button to select the table. (See [Junction Standard Editor: Visibility Analysis: Tables<sup>\(8830\)</sup>](#))

If the distance is calculated from an equation then select **Based on Equation** and click the [...] button to select the equation. (See [Junction Standard Editor: Visibility Analysis: Equations<sup>\(8820\)</sup>](#)).

5. If Visibility Distance is set to anything other than Fixed Distance then you will need to specify the **Speed** which may be set to a fixed distance or various values from your design.

If the speed is fixed then select **Fixed Speed** and type the value in the edit field provided.

Otherwise select one of the alternative options listed in the dropdown list box. Note that the speed generally refers to the subject but in some cases refers to the object, e.g. the Previous Entry Visibility type uses the speed of the vehicle on the previous entry to determine the visibility distance.

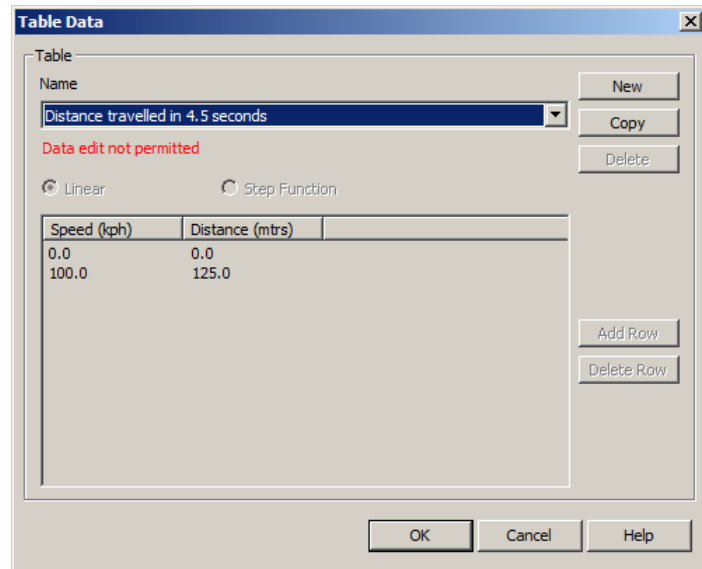
6. Select the **Subject Icon**, the icon (if any) that you want to use for the viewer.
7. Select the **Subject Position**, the road lane in which the viewer must be placed.
8. Select the **Subject Lateral Offset**, the offset of the viewer within the selected lane. This may be the centre of the lane or offset from the nearside or offside lane marking or kerb. If you select an offset then you must enter the value in the edit field provided.
9. Select the **Subject Longitudinal Offset**, the offset along the lane from a specified feature. This may be an offset from the yield line or from a crossing (if one exists) or, in the case of circulatory sightlines, an angular offset expressed as a whole circle bearing (WCB). In all cases you must enter an offset value in the edit field provided.
10. Enter the **Subject Eye Height**, the height of the viewer above ground level.
11. Select the **Object Icon**, the icon (if any) that you want to use for the target point.
12. Select the **Object Position**, the location of the object or target point.
13. Enter the **Object Height**, the height of the viewed object above ground level.
14. Tick **Hatch Visibility Area** if you want the visible zone to be hatched. If this is un-ticked you will see just the extents of the visible zone.



## Junction Standard Editor: Visibility Analysis: Tables <sup>(8830)</sup>

It is advisable to define data tables before creating any sightlines that use them. Data tables are simply lists of values

1. Click the **Tables** button on the Visibility page. The Tables dialog will appear.



Junction Standard Editor: Visibility Analysis: Tables

2. Select the required table from the drop down list.
3. The table values are pre-defined and will appear in the panel below.
4. You may edit the values in the table but not the units.
5. To add a row of data, click **Add Row**. A row will be inserted before the highlighted row. To add a row at the end of the table, deselect all rows and click **Add Row**.
6. To delete a row, highlight it and click **Delete Row**.
7. Click **Copy** to make a duplicate of an existing table for modification.
8. Click **New** to create a new table. The New Table dialog will appear. (See [Junction Standard Editor: Visibility Analysis: New Table <sup>\(8835\)</sup>](#))

## Junction Standard Editor: Visibility Analysis: New Table <sup>(8835)</sup>

The New Data Table dialog allows you to create new tables of pre-defined types. You should take care to specify the units of each data item correctly.

1. Click **New** to create a new table. The New Table dialog will appear.

Column	Title	Units
1	Speed	km/h
2	Distance	metres

Junction Standard Editor: Visibility Analysis: New Table

2. Select the table **Type** from the predefined list. This will determine the data columns that you see in the bottom section.
3. Enter the table **Name**, possibly including the table number or reference in the standard you are defining.
4. Set the type of interpolation between the control values as **Linear** or **Step Function**.
5. The table type defines the type of data that each column contains as well as the header text so the only data you can change in a new table definition is the units of the columns.
6. To change the **Units** simply select the require units from the dropdown list in each row of the table.
7. Click **OK** to save the table.

## Junction Standard Editor: Visibility Analysis: Equations <sup>(8820)</sup>

It is advisable to define equations before creating any sightlines that use them.

1. Click the **Equations** button on the Visibility Analysis page. The Equations dialog will appear.

**Equation Data**

Equation

Name

Sight Stopping Distance (METRIC)

New

Copy

Delete

$$d = 0.278tV + 0.039 \frac{V^2}{a}$$

Parameters

Parameter	Value	Units
Reaction Time (t)	5.2	seconds
Deceleration (a)	3.4	mtr/sec/sec

OK Cancel Help

Junction Standard Editor: Visibility Analysis: Equations

2. Any existing equations will be listed and may be selected from the drop down list.
3. Click **Copy** to make a duplicate of an existing equation for modification.
4. Click **New** to create a copy of an existing equation but with different parameters. The New Equation dialog will appear.

**Equation**

Equation

Select Equation

Sight Stopping Distance (METRIC)

$$d = 0.278tV + 0.039 \frac{V^2}{a}$$

Equation Name

Sight Stopping Distance (METRIC)

Parameters

Parameter	Value	Units
Reaction Time (t)	5.2	seconds
Deceleration (a)	3.4	mtr/sec/sec

OK Cancel Help

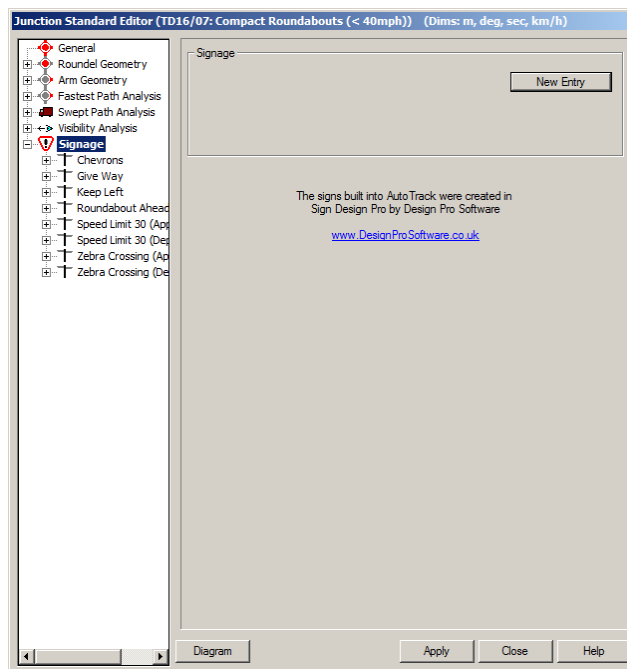
Junction Standard Editor: Visibility Analysis: New Equation

5. Select the equation **Type** from the predefined list. This will determine both the equation and the corresponding parameters in the bottom section.
6. Enter the equation **Name**, possibly including the equation number or reference in the standard you are defining.
7. Edit the parameter **Values** if necessary. You cannot edit either the parameter titles or the units.
8. Click **OK** to save the equation.

## Junction Standard Editor: Signage <sup>(8601)</sup>

AutoTrack Junctions contains a number of standard signs that are commonly used in the vicinity of roundabouts. These have been created in Sign Design Pro and kindly provided by our colleagues at Design Pro Software. To find out more about Sign Design Pro go to [www.DesignProSoftware.co.uk](http://www.DesignProSoftware.co.uk).

1. Signs are created by first creating a location (a 'post' if you like) and then adding signs to that location. Every sign will be available, though not necessarily visible initially, on all arms
2. Click **Signage** in the left hand pane. The Signage page will appear.



Junction Standard Editor: Signage

3. Click **New Entry** to create a new sign location. The Sign Location dialog will appear (See [Junction Standard Editor: Signage: Sign Location <sup>\(8602\)</sup>](#)).

## Junction Standard Editor: Signage: Sign Location <sup>(8602)</sup>

1. Click the **New Entry** button on the Signs page or select the required sign location from the expanded list. The Sign Location page will appear.

Junction Standard Editor: Signage: Sign Location

2. Enter the **Name** of the sign location. This is the name that will appear in the list of signs and must be unique.
3. Select the **Position** from the drop down list. Signs may be positioned **On Approach Road**, **On Departing Road**, **On Centre Island Opposite Arm**, **On Centre Island Between Arms** or **On Centre Island Opposite Entry**.
4. Signs are positioned relative to road features so that when the road geometry changes the signs can be adjusted too.
5. The Lateral Offset may be measured **Offset From Nearside Kerb**, **Offset From Offside Kerb**, **Offset From Centreline** or **Centred On Road**.
6. Longitudinal Offset is measured **Offset From Yield Line**, **Offset From Crossing**, **Offset from Crossing Then Yield Line**, **Offset From Centre Of Roundabout**.
7. **Post Height** is measured from ground level at the base of the post. Note that if you place a sign higher than the specified post height the post will be extended automatically.
8. Signs on approach or departing roads are aligned to the road alignment at the sign offset by default. Signs on the centre island are aligned to face directly outwards radially by default.
9. To rotate all the signs at this location set the **Angular Adjustment**. This is measured positive anti-clockwise.

10. By default signs have a single post centred on the sign width. To specify multiple posts enter the **Number of Posts** and the **Post Spacing**.
11. Tick **Show 2D Images** to place true scale images of the signs adjacent to the sign post oriented to the direction they face.
12. Tick **Show 2D Callout** to display an enlarged view of the signs at a separate location connected with a leader line. The location of this view can be adjusted with a grip.
13. To add a sign at this location click **Add Sign**. (See [Junction Standard Editor: Signage: Sign Location: Sign<sup>\(8603\)</sup>](#)).
14. To delete all signs at this location click **Delete**.

## Junction Standard Editor: Signage: Sign Location: Sign <sup>(8603)</sup>

1. Click **Add Sign** on the Sign Location page or select a sign in the left pane.

The screenshot shows the 'Junction Standard Editor (TD16/07: Compact Roundabouts (< 40mph))' window. The left pane lists various signs, with 'Give Way (D1)' selected. The main pane shows the configuration for the 'Give Way' sign, including Name, Appearance, Size, Mounting Height, Mounting Offset, Angular Adjustment, Visible by Default, and Mandatory checkboxes.

### Junction Standard Editor: Signage: Sign Location: Sign

2. Enter the sign **Name** which must be unique for this location.
3. The sign **Type** is currently set to **Fixed**. More options will be added in future.
4. Select the sign from the **Appearance** list.
5. Select the **Size** from the drop down list.
6. The **Mounting Height** is measured from ground level at the base of the sign to the lowest point on the sign.
7. Use **Mounting Offset** to place a sign offset to the right or left of the sign post. This value defaults to zero.
8. If you wish to rotate this sign relative to others on at the same location then enter the **Angular Adjustment**. To rotate all signs at a location enter the **Angular Adjustment** on the Sign Location page.
9. If you want the sign to be placed automatically when a roundabout is first created, tick **Visible by Default**.
10. If the sign is mandatory, tick **Mandatory**.

#### Note

*If you disable a mandatory sign in Junction Properties and audit exception will be generated.*



# Review

AutoTrack Review includes the tools you need to view, edit, assess and validate your AutoTrack projects.

If you only have the Review product then you will only be able to view data and not change it.

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## Properties



*Properties button*

The Properties command lets you look at the details of any AutoTrack entity in your drawing.

1. Select Properties from the AutoTrack drop down menu or click the Properties button on the AutoTrack Review toolbar. The Properties dialog appropriate to the entity you are editing will appear.
2. If you are editing a path then refer to ?? for more details.
3. If you are editing a parking row then refer to [Editing rows \(Parking Row Properties dialog\)](#) <sup>(4450)</sup> for more details.

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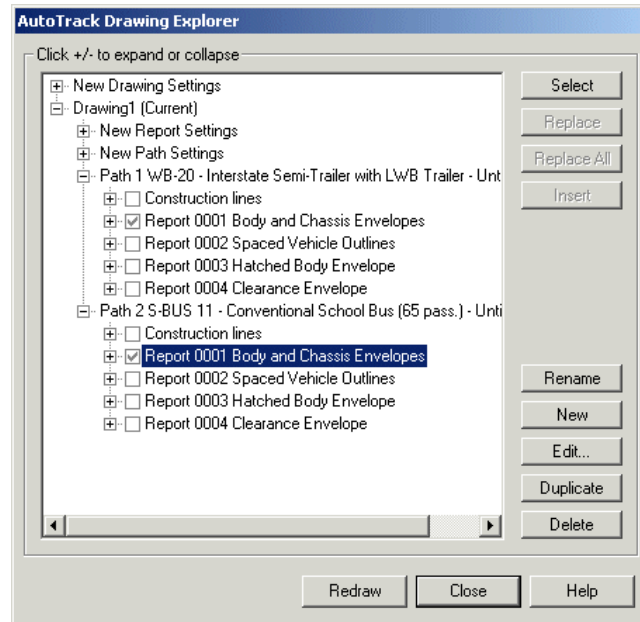
## Drawing Explorer <sup>(3300)</sup>

Sometimes you need to view or edit more than one path. For example, to apply the same colours and report settings to all paths. The Drawing Explorer allows you to edit all paths in all drawings.



*Drawing Explorer button*

1. Select **Drawing Explorer** from the AutoTrack drop down menu or click the **Drawing Explorer** button on the AutoTrack toolbar. The Drawing Explorer dialog will appear.



Drawing Explorer dialog

2. At the top of the window are the New Drawing Settings. This expands to display New Path Report Settings and New Path Settings. These are the default swept path settings **for new drawings**; i.e. the values stored in the settings files. The New Path Report Settings are used when you create a new report and the New Path Settings are used when you create a new path.
3. Underneath the New Drawing Settings are listed all the drawings that are currently open. Each one expands to display New Path Report Settings, New Path Settings and a list of AutoTrack entities. The New Path Report Settings and New Path Settings are the defaults used when you create a new report or path **in the current drawing**.
4. To edit an entity, currently either a Path or a Parking Row, highlight it and click **View** or **Edit**. The properties dialog appropriate to the entity type will appear. Refer to or [Editing rows \(Parking Row Properties dialog\)](#) <sup>(4450)</sup> for more details.
5. Each Path expands to display the Construction Lines and a list of Reports used by that path. This is the same list that you see when you edit a single path by clicking **Properties, Reports**. To view a report or construction line element highlight it and click **View** or **Edit**.

The following editing functionality is not available in the Review only product:-

6. To edit a report or construction line element highlight it and click **Edit** exactly as you do when you edit a single path using **Properties**.
7. To add a copy of a report, highlight it and click **Duplicate**. You can then use **Edit** to modify it.
8. To rename a report highlight the report and click **Rename**.
9. To add a new report based upon the new report settings for that drawing, highlight the report and click **New**.
10. To remove a report from the list, highlight it report and click **Delete**.

11. To apply the properties of a report element, a set of reports or a path to another like element, highlight the element you want to copy and click **Select**. Now go to the destination report element and click **Replace**. You can apply the properties to as many elements as you wish by highlighting them and clicking **Replace** or click **Replace All** to apply the properties to all the elements.
12. If the destination element is more senior in the hierarchy (a drawing contains paths and paths contain reports) then the properties of all child elements in the destination of the same type as the source element will be replaced with the source. This is best illustrated by a few examples:-

#### **Example 1**

If you select a report and replace a different report, the properties of the replaced report will simply be changed to match the selected report, i.e. the sub-reports that are selected, the colours, etc.

#### **Example 2**

If you select a report and replace a path, all reports in the replaced path will be removed and replaced by the selected report.

#### **Example 3**

If you select a report and replace a drawing, all the reports associated with all the paths in the drawing (including the New Path Settings and the New Report Settings) will be removed and replaced by the selected report.

#### **Example 4**

If you select a path and replace a drawing, all the properties of all the paths in the drawing (including the New Path Settings) will be replaced by those of the selected path.

13. If you want to add a report to another path or drawing, highlight the report you want to copy and click **Select**. Now highlight the destination path or drawing and click **Insert**. A copy of the selected report will be inserted into the path or into all paths in the drawing (including the New Path Settings and New Report Settings). As with **Replace** you can continue to click **Insert** to add the report to other paths or drawings.
14. As you will have realised by now, the extra power of the Drawing Explorer comes from the ability to replace or add reports to any or all paths within a drawing. In fact this ability extends beyond the current drawing and you can also replace reports or properties in any of the drawings listed in the explorer.
15. Most of the changes will only appear after you close the Drawing Explorer. If you want to see the effect of a change without closing the explorer click **Redraw**. However, you should note that every redraw adds data to the drawing to allow Undo to work so don't get carried away using Redraw for every little change or your drawing may become bloated.

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## **Simple animations (Basic Animation dialog) <sup>(8000)</sup>**

1. Select the path or paths that you wish to animate. If you do not

select any paths, AutoTrack will use the previous animation selections. If you have not run an animation this session and have not selected a path, all paths will automatically be selected.

#### Note

*If you are running the Review only product you may only play back existing animations.*



Animate button



Play button



Play backwards button



Fast Forward button



Record button



Single Step button



Single Step Back button



Reset button



Loop Button



Animation Settings button



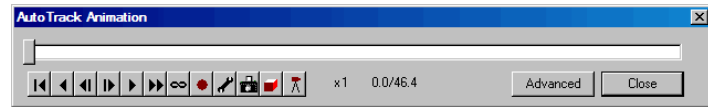
Snapshot button



3D Button



Fly-By Camera button



Animation dialog

2. Select **Animate** from the AutoTrack drop down menu or click the **Animate** button on the AutoTrack toolbar. The Animation dialog will appear.
3. The slider represents the complete animation and is effectively a time line with the start of the animation at the left hand side and the end of the animation at the right. You will notice how similar the buttons are to those on the Windows Media Player. Just to the left of the Advanced button you will see two figures separated by a backslash. These represent the current animation time and the total animation time.
4. Click the **Play** or **Play Backwards** button to start the animation. The button will stay depressed until either the animation ends or you click it again to stop the animation.
5. You can speed up the animation by clicking the **Fast Forward** button. Each click doubles the speed up to 32x and then it reverts to 0.25x, 0.5x and then normal speed. The current fast forward speed is displayed to the right of the **Record** button.
6. Alternatively, click the **Single Step** or **Single Step Back** buttons to move forwards and backwards along the animation one frame at a time, subject to the current fast forward speed, e.g. if fast forward is set to 4x it moves four times normal speed.

#### Note

*During animation the vehicle is drawn at stored intervals only. Since the "step" referred to is time based (one tenth of a second at normal speed) and not distance based, the vehicle may not move at every step.*

7. Finally, you can animate the vehicle using the using the slider bar.
8. Use the **Reset** button to restart the animation.
9. To play the animation indefinitely, depress the **Loop** button.
10. Click the **Record** button to record your animation. Refer to [Recording an animation as an AVI file](#) <sup>(8050)</sup>.
11. Click the **Animation Settings** button (AutoCAD & MicroStation only) to change the 3D animation settings. Refer to [Drawing Settings: Paths: Animations \(not Roads\)](#) <sup>(2150)</sup>.
12. Click the **Snapshot** button to take a screenshot. You will be prompted to save the image as a JPG file.

The following functionality is not available in the Review only product:-

13. Click the **3D button** (AutoCAD & MicroStation only) to view your

animation in 3D. Refer to [3D Animations \(AutoCAD & MicroStation only\)](#) 3D Animations (AutoCAD & MicroStation only).

14. Click the **Fly By Camera** button to view (AutoCAD & MicroStation only). Refer to [Fly-By Camera control \(AutoCAD & MicroStation only\)](#) <sup>(8060)</sup>.

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## Advanced animation options (Advanced Animation dialog) <sup>(8005)</sup>

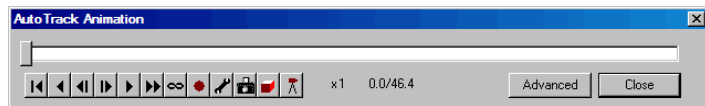
### Note

*You may only playback existing animations and may not change animation options if you only have the Review product.*



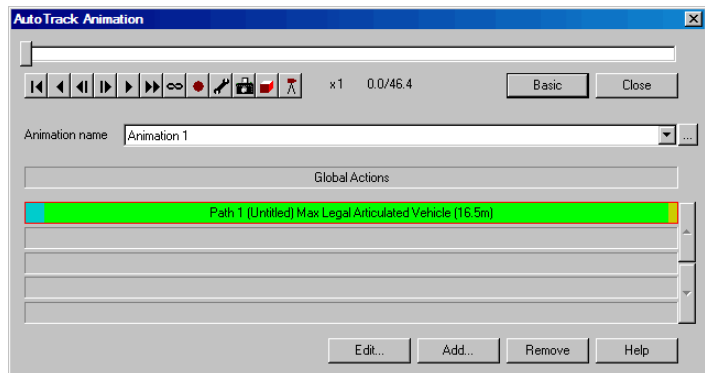
Animate button

1. Select a path and then select **Animate** from the AutoTrack drop down menu or click the **Animate** button. The Animation dialog will appear.



Animation dialog

2. Click the **Advanced** button. The Animation dialog advanced options will appear.



Animation dialog: Advanced options

3. You should see six horizontal bars. The lower five with the scroll buttons to the right represent potential paths to be animated. Unused bars are completely blank. Paths to be animated are shown as green and contain the name of the vehicle followed by the title of the path. If none of the bars is green then close the dialog, select a path and click Animate again.
4. To change the current animation, if you have more than one defined, select the required animation from the **Animation Name** drop down box.
5. The following functionality is not available in the Review only product:-
6. To edit one of the paths, highlight the relevant bar and click the **Edit** button (or just double click on the bar). The Path Animation dialog will appear (see [Path Animation dialog](#)).
7. To add a path, click the **Add** button. The Path Animation dialog will appear (see [Path Animation dialog](#) <sup>(8020)</sup> [Path Animation dialog](#)). Select the path that you wish to add from the drop down

list, adjust the settings if required (see [Path Animation dialog \(8020\)](#)) and click **OK**. The path will appear in the next available horizontal bar.

### Tip

If you want to create a traffic queue add the same path several times each with a greater start delay.

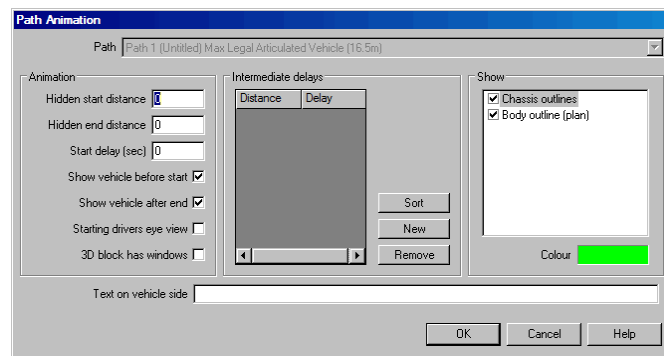
8. To remove a path from the current animation, highlight the path and click the **Remove** button.
9. To add, remove or edit a sound, annotation or CAD command, double click on the **Global Actions** bar. The Animation Commands dialog will appear (see [Animation Commands dialog](#)).
10. To add a new animation click the ... button alongside the **Animation Name** drop down box. The Animation list will appear (see [Animations dialog](#)).

## Path Animation dialog <sup>(8020)</sup>

### Note

*This option is not available on the Review only product.*

1. On the Animation dialog highlight one of the path bars and click **Edit** or just double-click on the bar. The Path Animation dialog will appear.



Path Animation dialog

2. Tick the relevant boxes in the **Show** frame to change the content or the colours of the animation. Note that in AutoCAD only 3D animations are in colour.

### Note

*You will only see tick boxes here for the outline types defined for the vehicle, e.g. you will typically not see a jet exhaust velocity tick box for a car.*

3. If you wish to animate only a section of this path you should set the **Hidden start distance** and **Hidden end distance**. The vehicle will not be animated over the hidden length of path. You may have to experiment a little with the distances.
4. If you are animating more than one vehicle you may wish to delay the start of one. To do this, enter a **Start delay** in seconds. Again, you may need to experiment with this.
5. By default the vehicle is shown at the start of the path before the animation starts and at the end after the animation ends. If instead you want the vehicle to appear when it is due to start

moving then untick **Show vehicle before start** and / or **Show vehicle after end**.

6. Tick **Starting driver's eye view** if you want the 3D animation to start with a driver's eye view from the vehicle on the selected path. Note that you can only animate one driver's viewpoint at a time so setting this option on one path unsets it on all others.
7. By default AutoTrack does not draw the tractor unit when animating the driver's eye view because it is normally an opaque block and visibility would be restricted! However, if you are using a custom 3D block that has a transparent windscreen for the tractor unit, you may wish to tick **3D block has windows**. This will ensure that AutoTrack draws the tractor unit.
8. The Intermediate Delays table allows you to pause the vehicle part way along the path. Click **New** to insert a pause at the current slider position. Edit the delay time and / or distance as required.
9. To remove an unwanted intermediate delay highlight it and click **Remove**.
10. Intermediate delays are listed in the order they are added. Click **Sort** to list them in order of distance from the start of the path.

#### Note

*The delays are sorted automatically every time the Path Animation dialog appears.*

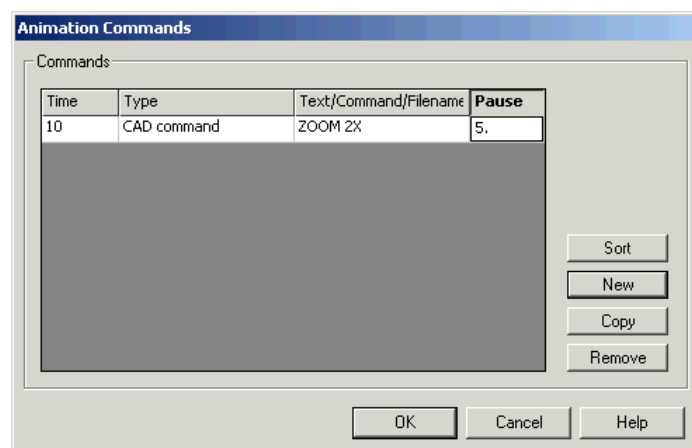
11. To display a text string on the side of your vehicle enter the text in the **Text on vehicle side** box.

## Animation Commands dialog <sup>(8040)</sup>

#### Note

*This option is not available on the Review only product.*

1. On the Animation dialog highlight the Global Actions bar and click **Edit** or just double-click on the Global Actions bar. The Animation Commands dialog will appear.



Animation Commands dialog

2. To insert a new command click **New**. The new command will be inserted at the current time in the animation but may be modified.
3. To insert a CAD specific command, for example, to zoom in, set the command **Type** to **CAD command**, click in the next field and

enter the command in the edit window. If you want to pause the animation after the command, enter a time in the **Pause** field.

4. To display a comment set **Type** to **Display annotation**, click in the next field and enter the text of the comment in the edit window. Your text will appear in the same window on playback so adjust the size and position of the window accordingly. If you want to pause the animation after the command, enter a time in the **Pause** field.
5. To play a wave file set the **Type** to **Play a sound**, click in the next field and browse to select the wave file. The sound file will play while the animation continues unless you enter a delay time in the **Pause** field.
6. (AutoCAD & MicroStation only) To specify a 3D camera showing the view of the driver of one of the animation paths, set the **Type** to **Driver's eye camera** and click in the next field to select the animation path.
7. (AutoCAD & MicroStation only) To specify a fixed camera position set the **Type** to **Fixed camera** and click in the next field to select the camera. Note that **{BASE VIEW}** and **{DEFAULT 3D VIEW}** are always defined and represent the view before entering 3D mode (i.e. before clicking the 3D button) and the view immediately after entering 3D mode (i.e. immediately after clicking the 3D button).
8. Initially new commands are added to the end of the list but you can use the **Sort** button to reorder the entries chronologically.
9. To remove a command simply highlight it and click **Remove**.
10. To duplicate an existing command highlight it and click **Copy**.
11. When you click **OK** to confirm the Global Commands bar will update to display icons representing each of your commands.

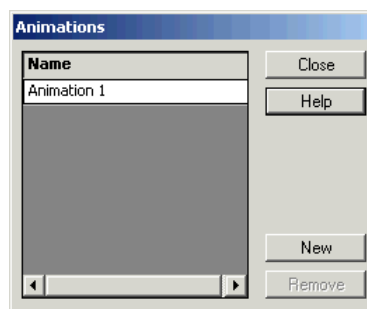
## Animations dialog <sup>(8010)</sup>

You can even create more than one animation, maybe to show different aspects of the same manoeuvre.

### Note

*This option is not available in the Review only product.*

1. On the Animation dialog, click the **More** button next to the **Animation Name** drop down box.
2. The Animations dialog will appear.



Animations dialog

3. At this point you can edit the names of the animations simply by placing the cursor in the relevant field.



4. To add a new animation click the **New** button and edit the name as required.
5. To remove an animation simply highlight it and click **Remove**.

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## 3D Animations (AutoCAD & MicroStation only)



3D Button

27. **Note**  
*This option is not available in the Review only product.*

1. To view your animation in 3D click the **3D button**.
2. By default the viewpoint will change and the animation will be displayed in perspective 3D. However, you can change the animation settings to control how and when the viewpoint changes. Refer to [Drawing Settings: Paths: Animations \(not Roads\)](#) <sup>(2150)</sup> for more information.
3. The vehicles will be displayed as wireframe, hidden line, Gouraud, basic, conceptual or realistic shaded according to your animation settings. The image style can be changed from the animation settings. Refer to [Drawing Settings: Paths: Animations \(not Roads\)](#) <sup>(2150)</sup> for more information.

### Tip

AutoTrack creates the 3D model of any vehicle automatically but you can also define your own block for use in 3D animations. Refer to [3D body shapes for animation](#) to learn how to do this.

4. You can play, single step, fast forward and even record animation just as in 2D.
5. If you deselect the 3D button the view will revert to the view prior to selection and you will be asked if you wish to save the camera position for future use. Saved camera positions may be specified in the [Animation Commands dialog](#) <sup>(8040)</sup>.

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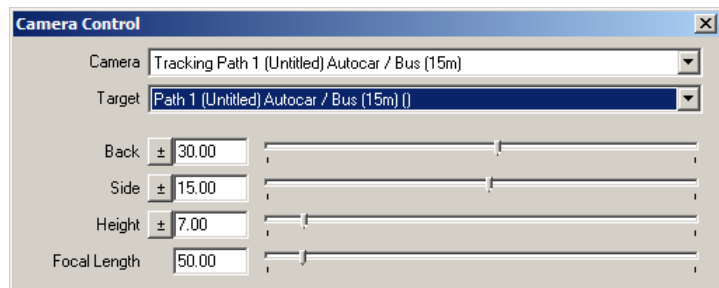
## Fly-By Camera control (AutoCAD & MicroStation only) (8060)



Fly-By Camera button

**Note**  
*This option is not available in the Review only product.*

1. To view your animation using the fly-by camera click the **Fly-By Camera** button. The **Camera Control** dialog will appear.



Camera Control dialog

2. Use the **Camera** drop down list to set the camera position. Options are Fixed, Tracking or Drivers Eye.

3. Use the **Target** drop down list to set what the camera is looking at. The options available depend upon the camera location:-

a fixed camera can be set to look at a vehicle on a path, a point or in a direction,

a tracking camera can only be set to be set to look at a point on a vehicle on a path, and

a drivers-eye camera can be set to look straight ahead or down at point on the path ahead, and

a watching camera can be set to look at static AutoTrack objects like junctions or parking rows.

4. The four sliders are used to control the position of both the camera and the target. The mouse scroll wheel provides a convenient way to adjust the values by small amounts – first place the cursor in the field you wish to edit. Note that if you change camera type all the adjustments you have made will be lost even if you return to the original type.

5. Fixed camera

Use the **X, Y & Z** sliders to control the position of the camera in real world coordinates and the **Focal Length** slider to control how large the image appears in the window.

If the camera target is a fixed point in space then depress the **Camera Target Point** button and use the sliders to specify this point.

Similarly if the camera target is a fixed direction then depress the **Camera Target Point** button and use the sliders to specify this direction.

6. Tracking camera

Use the **Back, Side & Height** sliders to control the position of the camera relative to the vehicle in real world coordinates and the **Focal Length** slider to control how large the image appears in the window.

7. Drivers-Eye camera

Depress the **Mirror View When Reversing** button to display what the driver would see in the wing mirror on the inside of the turn when reversing.

If the camera is set to look down at the path then use the **Look Ahead** slider to control the distance of the viewpoint along the path.

8. Watching camera

Use the **X, Y & Z** sliders to control the position of the camera in real world coordinates and the **Focal Length** slider to control how large the image appears in the window.

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## Recording an animation as an AVI file <sup>(8050)</sup>

### Note

*This option is not available in the Review only product.*

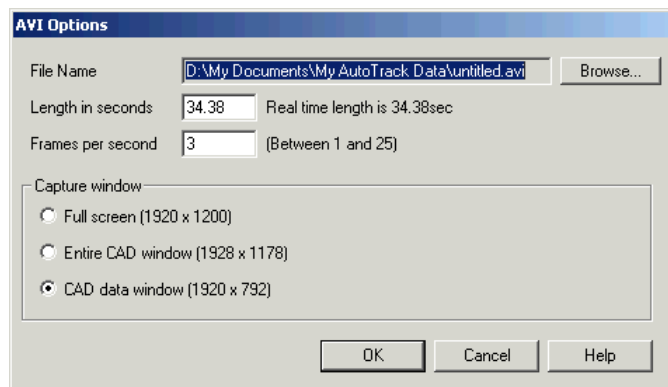
Recording an animation can take some time depending upon the speed of your computer and the length and complexity of the animation.

The record option records everything in the selected area so we recommend that you switch off screen savers and do not use other applications whilst recording.

1. Having prepared an animation click the **Record** button in the AutoTrack Animation dialog. The **AVI Options** dialog will appear.



Record button



AVI options dialog

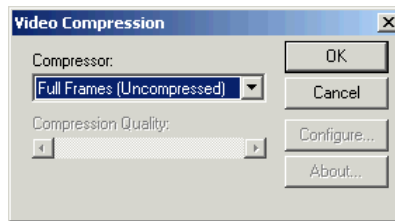
2. Use the **Browse** button to specify the **File Name**. The File Name field is read only. By default AutoTrack will create the AVI file in the same directory as the drawing file. If the drawing file has not been saved then it will create the file in your current directory.
3. **Length in seconds** is the duration of the resulting AVI movie. This is set by default to the real time length which is also shown in the adjacent text.
4. **Frames per second** is set by default to 3. Increasing this value will give you smoother movie but it will take longer to generate and the file size will be larger. Depending upon the design speed, you may also need to reduce your storage interval. We do not recommend a setting lower than 3 since this results in a jerky playback.

### Tip

A rule of thumb is that your frame rate should be less than the design speed divided by the storage interval. You may wish to adjust the storage interval in order to allow a higher frame rate.

5. Normally we suggest that the **Capture window** be set to **CAD data window**. This omits the CAD system window, including caption, frame, CAD toolbars and docked controls and edit windows. Bear in mind that for best results the AVI file should be played back at the same size as it is recorded and typical playback monitors may have much smaller screen area than a typical CAD system. The option **Entire CAD window** includes the host CAD system controls and **Full screen** includes everything visible on the screen.

6. Click **OK**. The Video Compression dialog will appear.



Video Compression dialog

7. The **Compressor** drop down lists all the compression codecs installed on your computer. Select the one you wish to use and click **OK** to start the AVI writing process, or **Cancel** to cancel the changes and return to the Animation dialog.

#### Tip

We recommend the use of the **XviD video compression codec** which is supplied with AutoTrack. This codec is extremely fast and efficient and produces high quality results of a size that can be emailed.

8. If you do not use the XviD codec there are a number of others supplied as standard with Windows not all of which can be used to create compressed video, some permit playback only. Various codecs are supplied as standard with Windows which may be used to create video files including Cinepak Codec by Radius, Microsoft Video 1, Indeo Video 5.1 & Intel Indeo Video 4.5.
9. Some codecs are configurable (the configure options are codec dependent) and in these cases the **Configure** button and/or the **Compression Quality** slider will be enabled as soon as you select a codec.
10. Click **OK** to confirm and generate the AVI file. Do not make changes to the screen at this stage as they will all be recorded.

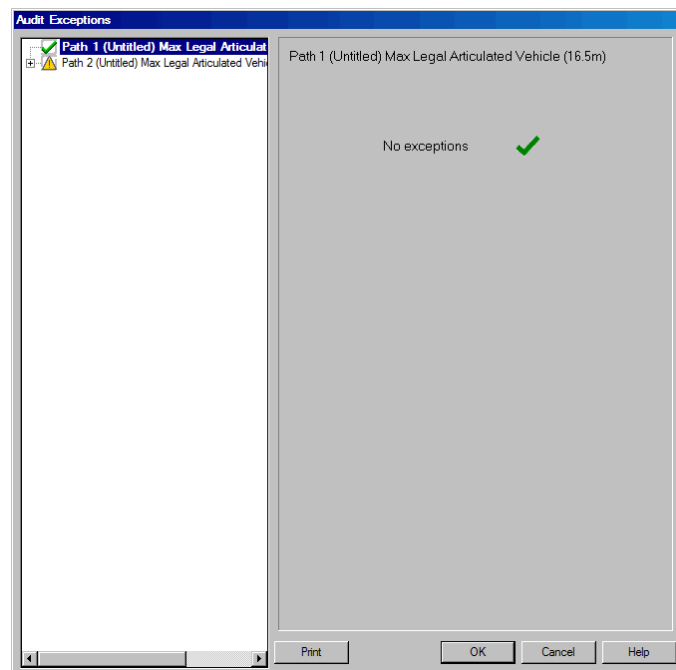
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# Audit

The Audit tool lets you check your AutoTrack objects for basic errors. It can be used equally well by engineers at design stage to check their own work and later by checking authorities using the Review product. Changes to the audit results are saved with the drawing.

## Audit dialog <sup>(8210)</sup>

1. Save your drawing and then click the **Audit** button. The Audit Exceptions dialog will appear.



Audit dialog

2. The left hand pane lists every AutoTrack entity in the drawing.

entities with no exceptions or with exceptions that have been approved are listed with a green tick,

entities with one or more exceptions that have been rejected are listed with a red cross, and

entities with one or more exceptions that are awaiting assessment are listed with an orange warning triangle and the exceptions are listed as 'children' in the tree view.

3. The content of the right hand pane varies according to what is selected in the tree view.

If you highlight an AutoTrack entity in the left hand pane then the right pane shows summary data for that entity, i.e. the name of the entity, the total exceptions and the exception status breakdown.

If you highlight an exception in the left hand pane then the right pane shows the detail of that exception.

4. To print an Audit report click the **Print** button. Refer to [Print Audit Options dialog](#) <sup>(8220)</sup>.

## Audit dialog: Exception Details <sup>(8200)</sup>

1. Highlight an exception in the left hand pane and the Exception Details will appear in the right hand pane.

The screenshot shows the 'Audit Exceptions' dialog box. On the left, a tree view lists exceptions, with 'Turn Transitions Disabled' highlighted. The right pane shows the details for this exception. The 'Exception' section contains the text 'Turn Transitions Disabled' and 'Turn transitions have been disabled 23.52m from the start of the path.' Below this is a 'Justification' section with a large text area. Underneath are 'Justified By' and 'Date' fields, with the date set to '04/05/2010'. The 'Assessment' section includes a 'Status' dropdown menu set to 'Pending', 'Assessed By' and 'Date' fields (also set to '04/05/2010'), and a 'Comments/Conditions' text area. At the bottom of the dialog are four buttons: 'Print', 'OK', 'Cancel', and 'Help'.

Audit dialog: Exception Details

2. Exceptions are typically justified by the designer and then assessed by a checking authority.
3. Before an exception can be assessed it must be considered justified by the designer or submitting body. The designer should enter his justification for the exception in the edit field marked **Justification**.
4. The action of entering text in the Justification field will enable the **Justified By** field which will in turn enable the **Date** and **Justified** tick box.
5. Only when the **Justified** box is ticked will the assessment fields be enabled. The justification fields will now be disabled.
6. If an object is edited causing an exception to move, the justification fields will be reset. At this point the user may either enter the justification again or click the **Recall** button (if enabled) to recall the last justification used. Clicking the **Recall** button will restore other justifications. Finally, the user must tick the **Justified** box to confirm.
7. Once justified exceptions can have one of four assessment statuses:-

**Pending:** An exception that has yet to be assessed,

**Approved:** An exception that has been assessed and approved unconditionally,

**Approved With Conditions:** An exception that has been

assessed and approved subject to stated conditions, and

**Rejected:** An exception that has been assessed and rejected.

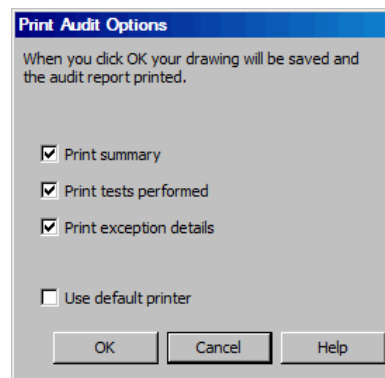
8. The top frame contains the details of the exception and, where appropriate, a location on the entity.
9. The middle section allows the engineer to provide a justification for, or explanation of, the exception together with space for a name or initials and a date.
10. Finally the lower section is for the checking authority to grant an approval status.

**Note**

*The Status can be changed regardless of whether any justification has been provided.*

## Print Audit Options dialog <sup>(8220)</sup>

1. Click the **Print** button on the Audit dialog. The Print Audit options dialog will appear.



Print Audit Options dialog

2. Tick **Print Summary** to include a summary of the audit results including number of entities and number of exceptions grouped by status.
3. Tick **Print Tests Performed** to list all the tests carried out.
4. Tick **Print Exception Details** to include full details of each exception.





# Managing AutoTrack data

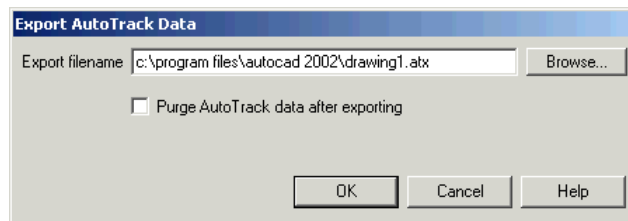
AutoTrack generates the same data regardless of the operating system or CAD system but it is stored in the CAD system native drawing format and CAD systems cannot always read each others drawing files.

However, AutoTrack incorporates a system to transfer data. Basically, data is exported from one CAD system and then imported in the receiving CAD system.

---

## Exporting AutoTrack data (Export AutoTrack Data dialog) <sup>(5090)</sup>

1. Select **Export AutoTrack data** from the AutoTrack Utilities menu. The Export AutoTrack data dialog will appear.



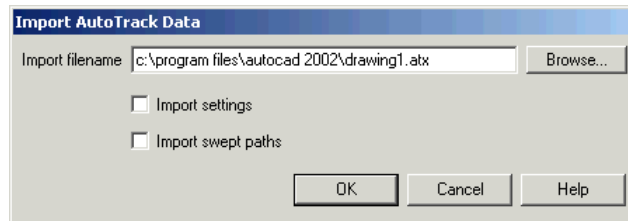
Export AutoTrack data dialog

2. By default AutoTrack will assume that you want to create an export file in the same directory and with the same base name as the current drawing. If you wish to specify a different file use the **Browse** button and edit box to specify the export filename.
3. Tick **Purge AutoTrack data after exporting** to effectively transfer the AutoTrack data to another drawing. This will write the transfer file and then remove all AutoTrack data from the source drawing.

---

## Importing AutoTrack data (Import AutoTrack Data dialog) <sup>(5080)</sup>

1. Select **Import AutoTrack data** from the AutoTrack Utilities menu. The Import AutoTrack Data dialog will appear.



Import AutoTrack data dialog

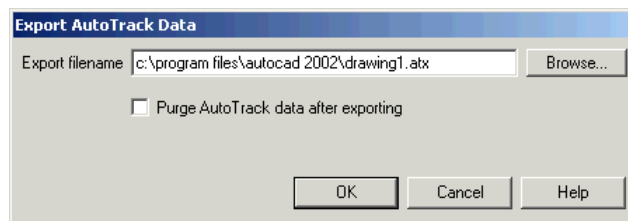
2. AutoTrack will look in the current directory for an AutoTrack export file with the same base name as the one currently loaded. If it finds one it will display it as the default. If you wish to import a different data file then use the **Browse** button to find it.
3. Tick **Import Settings** if you want the imported settings to replace your current AutoTrack settings.
4. Tick **Import Swept Paths** if you want to import the swept paths.
5. If you tick neither box no data will be imported.

---

## Using Export / Import for personal settings

You can save personal settings on a computer used by several people by enabling the option to save settings to your “My Documents” folder (See [System Settings: Start Up](#)). However, if you do not want to enable this option you can use Export and Import to give the same result...

1. Run AutoTrack and set your preferences.
2. Select **Export AutoTrack Data** from the AutoTrack Utilities menu. The Export AutoTrack Data dialog will appear.



Export AutoTrack data dialog

3. Browse to your personal area (e.g. your personal documents and settings directory or personal area on the file server).
4. By default AutoTrack creates an export file with the same name as the current drawing so we recommend that you change the filename to something more appropriate, maybe something like `ATR_SETTINGS`.
5. Click **OK** to save the file.
6. When you next run AutoTrack select **Import AutoTrack data** from the AutoTrack Utilities menu.

7. When the Import AutoTrack data dialog appears tick only the **Import settings** box before clicking **OK** to load the settings.

---

## Drawing file size

AutoTrack data is stored in the host CAD drawing allowing you a number of benefits. However, as you use AutoTrack the host system frequently needs to make temporary copies of data. Most of these copies may be removed but, depending upon how your CAD system is configured, they often are not.

Luckily there are ways that you can recover the space taken by the working data.

### Recovering space in AutoCAD drawings

By default AutoCAD does an incremental save of the drawing using **QSAVE**. This does not remove all deleted and temporary objects.

Use **PURGE** to remove all unused objects or **SAVEAS** to perform a full save and remove superseded data.

### Recovering space in MicroStation drawings

Use **COMPRESS DESIGN** to remove superseded AutoTrack data.

---

## Repair AutoTrack data

Under certain circumstances and on rare occasions AutoTrack data links can become broken. So, for example, a layer used by an AutoTrack path may be deleted. The Repair AutoTrack data function is used to reinstate these links. It is very simple to use.

1. Select **Repair AutoTrack data** from the AutoTrack Utilities menu.
2. AutoTrack will scan all AutoTrack objects and try to repair any broken data links.

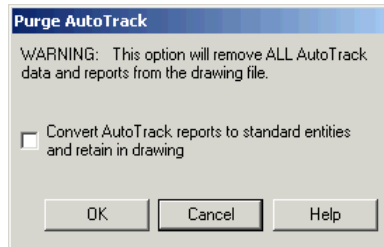
---

## Purging AutoTrack data (Purge AutoTrack dialog) <sup>(5060)</sup>

The following procedures will remove ALL AutoTrack data from your drawing, including vehicles and reports. You will be given the option to retain the reports as AutoCAD entities but you should note that they will no longer be editable using AutoTrack.

### AutoCAD version

1. Load the drawing that you wish to purge into AutoCAD.
2. Select **Purge AutoTrack** from the AutoTrack, Utilities menu.
3. Alternatively, type **PURGEAUTOTRACK** on the command line.
4. The Purge AutoTrack dialog will appear.

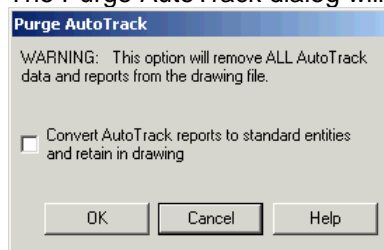


Purge AutoTrack dialog

5. Check the **Convert AutoTrack reports** box if you wish to leave any AutoTrack reports in your drawing as simple lines.
6. Click **OK**.

#### MicroStation version

1. Load the drawing that you wish to purge into MicroStation.
2. Select **Purge AutoTrack** from the AutoTrack, Utilities menu.
3. Alternatively, select Key in from the Utilities menu. The Key in dialog will appear. Select `ATRACK` from the first column and `PURGE` from the second. Click **Key in**.
4. The Purge AutoTrack dialog will appear.



Purge AutoTrack dialog

5. Check the **Convert AutoTrack reports** box if you wish to leave any AutoTrack reports in your drawing as simple lines.
6. Click **OK**.

28.

# Glossary of Terms

## Active Hitch

A type of rear axle consisting of a drawbar with the bar facing rearwards linked to the front axle or articulation point (hence 'active').

## Actual Wheelbase

The distance between the innermost axles on a tractor, or the distance from kingpin or drawbar pivot point to the innermost rear axle on a drawbar or semi-trailer.

## Approach Stopping Sight Distance

The required line of sight on approaching a roundabout. The approaching driver must be able to see a point on the yield line or the crossing from point far enough back that he can stop if necessary.

## Apron

The Apron, or Overrun Area, is a zone provided **outside** the Centre Island for larger vehicles to track over. The outer limit of the Apron is the offside limit for normal vehicles turning 270 degrees.

### Note

*In some parts of the world (notably the USA) the apron is considered to be a part of the island, in others (notably the UK) it is considered to fall between the island and the main circulation area. In Junctions the apron is considered to fall outside the central island, i.e. the apron diameter may never be smaller than the island radius.*

## Apron Diameter

The diameter of the Apron, or overrun, area. The apron diameter is never smaller than the centre island diameter.

## Apron Width

The Apron Width is the difference between the radius of the Apron that of the Centre Island. It may never be less than zero.

## Arm

A road that connects to a junction. Known in some parts of the world as a leg.

## **AutoDrive**

A means of driving the vehicle in which the path from a given position is calculated automatically as you move a target point (the cursor).

## **Authorisation code**

A code needed to update the hardware lock to run each new version. May also be needed when you purchase extra features.

## **Axle Spacing**

The distance between adjacent axles in a multi-axle group at the front or rear of a component.

## **Backward Visibility on Entry**

Visibility to the right on entry to a roundabout when driving on the left or to the left on entry to a roundabout when driving on the right.

## **Baseline**

The baseline is the line that passes along the back of a row of parking bays.

## **Bay markings**

The bay markings include the painted lines, symbols and hatching used to delineate the preferred position of the car.

## **Bay style**

Each different composition of markings, safety zones, symbols and parking accessories is call a bay style.

## **Bay symbol**

Bay symbols are the graphics painted within the bay and used to indicate, for example, bay usage.

## **Bend island**

Bend islands are placed where a row of parking bays changes direction.

## **Blend Point**

The point on a junction arm alignment at which it joins, or blends with, the existing road.

## **Castor Steering**

Wheels that are part of a fixed axle group but that are free to rotate. Sometimes referred to as self-steered wheels.

## Cats Whiskers

See [Predictive Turning](#).

## Centre Island (or simply Island)

The non-traversable island at the centre of a roundabout which is the normal offside limit for vehicles turning 270 degrees.

### Note

*Some parts of the world (notably the USA) consider the centre island to include an overrun area for large trucks. Junctions regards this overrun area as falling outside the centre island.*

## Centreline Offset

The perpendicular distance between the tangent to the arm alignment at the ICD and the centre of the island. The offset is positive if the tangent passes the centre of the island on the opposite side to the entry road. Thus, in general, the larger the centreline offset the larger the entry deflection, and vice versa.

## Circulatory Carriageway Median

The path of a vehicle travelling midway between the inscribed circle and the centre island.

## Circulatory Width

The Inscribed Circle radius minus the Island radius.

Note: The preferred physical vehicle path limit will typically be inside this.

## Conflict Angle

See [Entry Angle](#).

## Cramp Angle

A term (seemingly used only by US fire departments) for the maximum wheel angle. See also [Wheel Cut](#).

## Crossing Visibility on Approach

To be added.

## Crossing Visibility on Next Exit

To be added.

## Cut-in Point

The point at which the spine of the element is tangential to the arc that it transcribes.

## Cut-in Radius

The radius of the arc traversed by the Cut-in Point.

## Definition Line

A virtual line representing a roadway limit. The physical Kerb Line may or may not coincide with this line.

## Dongle

Slang name for a Hardware Lock.

## Drag Lines

Lines drawn from the grips used to extend the path to the front most and rearmost grips on the vehicle. These lines vary in length according to the vehicle size and can be switched off.

## Drawbar

A rigid towing bar attached rigidly to an axle. The bar and axle turn as one unit.

## Drawbar Articulation Angle

The angle subtended at the axle pivot of a drawbar by the drawbar and associated trailer spine.

## Drawbar Length

The length of a drawbar is measured from the centre of turning of the relevant axle group to the physical end of the drawbar. The coupling at the remote end must be defined separately in AutoTrack.

## DXF File

DXF stands for Drawing Exchange Format, a text file format used to transfer data between dissimilar CAD systems. Supported by many CAD systems.

## Dynamic Edit

See [Dynamic Editing](#).

## Dynamic Editing

Editing a path by dragging the grips at target points (and / or intermediate points) to new locations. The path updates automatically when the grip is dropped.

## Effective Fixed Axle

The effective fixed axle is the single axle that would have the same effect on the vehicle swept path as the fixed axle group. It is the centroid of the



group after the effects of retracted and self-steered axles are taken into account.

### **Effective Front Axle Offset**

The offset of the effective front axle from the reference datum. Positive if the effective axle position is behind the reference datum.

### **Effective Front Track Width**

The distance between outer faces of the front wheels to be used in path calculations.

### **Effective Rear Axle Offset**

The offset of the effective rear axle from the reference datum. Positive if the effective axle position is behind the reference datum.

### **Effective Rear Track Width**

The distance between outer faces of the rear wheels to be used in path calculations.

### **Effective Steered Axle**

The effective steered axle offset is the single axle that would have the same effect on the vehicle swept path as a given steered axle group. It is the outermost axle of the steered axle group, i.e. the furthest forward on a front axle group and the furthest back on a rear axle group.

### **Effective Wheelbase**

The distance between the Effective Front and Rear Axles.

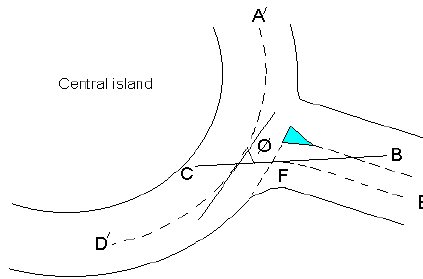
### **End island**

End islands are non-parking areas placed at the ends of rows of parking bays.

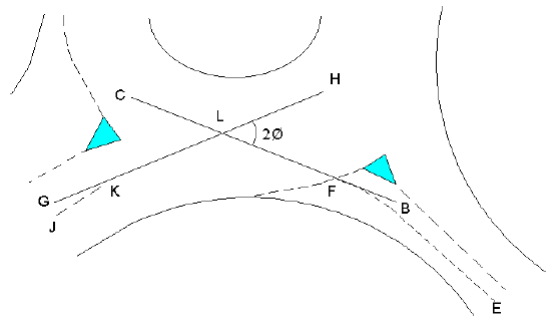
### **Entry Angle**

The entry angle or conflict angle,  $\Phi$  (phi), is a geometric proxy for the angle between entering and circulating streams. It is calculated in one of two ways depending upon whether the entry and exit tangents intersect with respect to the median circulation path.

When the entry and exit tangents intersect 'inside' the circulatory carriageway median, the entry angle is the angle between the entry tangent and the tangent to the circulatory carriageway median at the intersection point.



When the entry and exit tangents intersect 'outside' the circulatory carriageway median, the entry angle is half the angle between the entry and exit tangents.



## Entry Deflection

The extent to which a vehicle must deviate from a straight line path to negotiate the entry to the roundabout.

## Entry Path Radius

The radius of the fastest vehicle path at, or close to, the entry yield line.

## Entry Tangent

The tangent to the path of an entering vehicle at the intersection of the entry path and the yield line.

## Exit Tangent

The tangent to the path of an exiting vehicle at the intersection of the exit path and the ICD.

## Envelope

A single line representing the maximum body or wheel movement. In the case of vehicle bodies it is the outer limit of movement of any point on any body. In the case of wheels it is the outer limit of travel of any wheel.

## Exit Overtake

An exit overtake is when a vehicle continues past the point at which it would normally start the turn (i.e. delays the start of the turn) prior to turning back and exiting the turn. The lateral deviation from the normal path is the exit overtake distance.

## **Fastest Line**

The Fastest Line is the centreline of the path taken by a vehicle travelling as fast as possible through the junction. It is defined by various standards in different ways but usually there is a minimum offset from the apex of the path at entry, exit and island. There are also often specified starting and ending positions.

## **Fifth Wheel**

A horseshoe shaped coupling device on a tractor that connects to a pin on a semi-trailer called a kinpin.

## **Flare Lane**

An extra lane added at the entry to a roundabout used to manage vehicle movements.

## **Follow**

A means of driving a vehicle in which you specify a required path as a polyline and let the vehicle attempt to follow it.

## **Forward Circulatory Visibility**

Visibility around the circulation area.

## **Forward Fastest Path Visibility**

Visibility from an entering vehicle on the fastest path to the conflict point on the fastest entry path from the next arm.

## **Forward Visibility on Entry**

Visibility to the left on entry to a roundabout when driving on the left or to the right on entry to a roundabout when driving on the right.

## **Grips**

Small squares that appear when an object is selected. Grips can be selected and moved using the mouse.

## **Hairpin marking**

A type of parking bay marking comprising twin sidelines connected at the entrance.

## **Hardware Lock**

A hardware lock or dongle is a security device that must be plugged into the parallel port of your computer to allow AutoTrack 5 to run.

## **Head up display**

A display of data that the user can see without diverting his or her gaze from the task in hand.

## HUD

See [Head up display](#).

## In bay numbering

In bay numbering is when bay numbers are placed within each marked parking bay.

## Independent Bogies

Multiple linked bogies arranged along a unit each with their own turntable. Also known as Tandem Axles. See also Pendel Axles.

## Inscribed Circle

The Definition Line representing the outer limit of the Circulatory Width.

## Intermediate Grips

Transient editing grips that are displayed along the path between Target Points to make path editing easier. An Intermediate Grip becomes a Target Point if it is selected.

## Intersection Sight Distance

Visibility to traffic entering from the previous arm and/or traffic already circulating.

## Kerb Line

A line representing the roadside edge of the physical kerb.

## Kerb Offset

The distance that the Kerb Line is offset (outside) the Definition Line.

## Kerbside numbering

Kerbside numbering is when the bay numbers are placed adjacent to the bay.

## Kerb-to-Kerb Turning Circle Radius

The radius of the smallest circle within which the vehicle's wheels can turn. It is assumed that this occurs when full steering lock is applied.

## Kingpin

A pin on a semi-trailer that connects to a horseshoe shaped coupling device on a tractor called a fifth wheel.

## Lane Line

A line between lanes of traffic travelling in the same direction.

## Layer

A means of grouping objects together within an AutoCAD drawing. The properties of layers (e.g. visibility) may be controlled independently of the objects they include. See also Level, the equivalent in MicroStation.

## Level

A means of grouping objects together within a MicroStation drawing. The properties of layers (e.g. visibility) may be controlled independently of the objects they include. See also Layer, the equivalent in AutoCAD.

## Linkage Proportion

The linkage proportion is the proportion of the articulation or wheel angle at one end of a unit that is applied to the axle group at the other end. The proportion may be specified in terms of angles or tangents of angles. In arithmetic terms if the linkage is on an angular basis the linkage proportion would be:-

$$\text{LinkageProportion} = \text{LinkedAngle} / \text{PrimaryAngle}$$

If the linkage is on a tangential basis the linkage proportion would be:-

$$\text{LinkageProportion} = \tan(\text{LinkedAngle}) / \tan(\text{PrimaryAngle})$$

We understand that the latter is the more common form of linkage and in this case the effective cut in point offset is fixed for all primary angles.

## Loci

The plural of locus. See [Locus](#).

## Lock

Steering angle; thus, maximum left lock is the maximum steering possible when turning left and right lock is the maximum when turning right.

## Lock to lock time

Lock-to-lock time is the time that it takes the driver of the vehicle to turn the steering from the maximum angle (full lock) in one direction to maximum angle (full lock) in the opposite direction in a single continuous movement.

## Locus

The path of a moving point in space. In the context of AutoTrack the path of the wheel tracks or the body vertices. Referred to in AutoTrack in it's plural form loci.

## Manual Drive

A means of driving a vehicle that uses a control overlay displayed on screen. The vehicle moves forwards, reverse, left and right according to the position of the cursor on the control overlay.

## Maximum Drawbar Articulation Angle

The largest Drawbar Articulation Angle permitted.

## Maximum Wheel Angle

The maximum angle of any wheel in a group, i.e. at the front or at the rear. This is normally the inside wheel on the innermost axle but may be otherwise if the widths of the axles in the group vary. See also 'Cramp Angle' and 'Wheel Cut'.

## Minimum Cut-in Radius

The radius of the arc traversed by the Cut-in Point when the vehicle is turning at the Maximum Steering Angle.

## Model Settings

The criteria that control the how a specified vehicle should behave in a specific situation. For example, a lower limit might be placed on the allowable lock rate.

## Nearside

The side closest to the passenger in a standard passenger car designed for the region.

## Object enabler

An AutoCAD add-on that allows third party entities, like AutoTrack path entities, to be regenerated but not edited.

## Offset Envelope

The envelope of maximum body or wheel movement with a further margin added. This may represent a safety or clearance margin.

## Offside

The side closest to the driver in a standard passenger car designed for the region.

## Overrun Area

## See [Approach Stopping Sight Distance](#)

The required line of sight on approaching a roundabout. The approaching driver must be able to see a point on the yield line or the crossing from point far enough back that he can stop if necessary.

Apron.

## Overturn

A technique for reducing the vehicle cut-in on corners whereby the vehicle either turns temporarily in the opposite direction (side overturn) or delays the exit from the turn (exit overturn).

## Overturn angle

When performing an overturn (side or exit) the overturn angle is the angular deviation of the wheels from the path the same vehicle would take if performing a non-overturn manoeuvre.

## Pendel Axles

Multiple linked bogies arranged both across and along a unit that turn in much the same manner as Ackerman axles, i.e. those axles furthest away from the centre of turn follow the widest radius arc.

## Predictive Turning

Predictive Turning is an AutoDrive feature that displays the limits of the vehicle path **from** the last position placed and the limits of body or wheel envelope **from** the ghosted unselected position. Also known as “Cat’s Whiskers”.

## Primary Axle

The innermost axle of a group, i.e. the rearmost axle of a front axle group and the front most axle on a rear axle group.

## Privacy post

Privacy posts are used to prevent use of parking bays by unauthorized personnel.

## Profile

A profile is an AutoTrack object that lets you display a side or plan view of a vehicle complete with dimensions.

## Profile View

A profile view is an AutoCAD Civil 3D object that lets you display ground profiles as graphed lines on a grid. For more details please refer to the AutoCAD documentation.

## Rail wheels

Wheels designed to run on rails typically with an inner flange to prevent the wheel from derailing.

## Retracted Axle

An axle that is present but not in contact with the road surface. Retracted axles are ignored when AutoTrack calculates the effective axle positions.

## **Safety post**

Safety posts may be placed at the ends of parking bays to prevent vehicles from overshooting.

## **Safety zone**

Safety zones are areas of extra space provided to meet special requirements and are measured from the centres of the bay side and entrance lines.

## **Script**

A means of driving a vehicle by issuing commands such as; forwards 10 metres, turn left 30 degrees, continue for 5 metres.

## **Secondary steering**

A turning axle group whose angle is controllable but which is not the main steering for the vehicle. The axle may be linked to another axle or independently controllable.

## **Secondary steering angle**

The angle of an imaginary wheel at the centre of a secondary steering axle. See [Secondary steering](#).

## **Self-steering**

Wheels that are part of a fixed axle group but that are free to rotate. Sometimes referred to as castors.

## **Separator Line**

A line between lanes of traffic travelling in opposite directions.

## **Service type**

The different usages of parking areas are called service types.

## **Side Overturn**

A side overturn is when a vehicle starts a turn with opposite lock for a short distance prior to making the turn. The lateral deviation from the normal path is the side overturn distance.

## **Splitter**

The splitter is formed by the boundaries of the entry and exit roadway Definition Lines and the Inscribed Circle.

## **Splitter Island**

The Splitter may include a Splitter Island, especially if there are pedestrian crossings. The physical limits of the Splitter Island are normally inside the Splitter.



## Steering Angle

The angle of an imaginary wheel at the centre of the controlling axle or coupling.

## Stub axle

An axle carrying wheel(s) at only one end.

## Stub axle length

The length of a stub axle is measured from the pivot point to the centre of the wheel group.

## T-markings

A type of parking bay marking consisting of a T painted at the entrance between each adjacent parking bay . The leg of the T runs a short distance down the side of the bay and the cross runs part way along the entrance line.

## Tandem Axles

See [Independent Bogies](#).

## Target Point

A point through which the vehicle must travel.

## Tracking Point

The Tracking Point is the point on the vehicle that must pass through the specified Target Points. It is the point on the vehicle that you move and position when you use AutoDrive and also the point that follows the line in the Follow drive mode.

## Tyred Wheels

Wheels with tyres fitted.

## Vehicle class

Vehicles using parking areas are grouped into classes; vehicles with similar parking requirements.

## Wall-to-Wall Turning Circle Radius

The radius of the smallest circle within which the vehicle's body can turn. It is assumed that this occurs when full steering lock is applied.

## **Wheel Cut**

**A term (seemingly used only by US fire departments) for the maximum wheel angle. See also [Conflict Angle](#)**

[See Entry Angle.](#)

[Cramp Angle.](#)

## **Wheel Diameter**

The diameter of the outer face of the tyre.

## **Wheel stop**

Wheels stops are placed at the ends of bays to prevent the vehicle from overshooting.

## **Wheel Track**

The distance between the outer faces of the wheels on an axle.

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