CHAPTER 1

Introduction

Welcome to CALRoads View - a Windows interface for the following California Department of Transportation (CALTRANS) and U.S. Environmental Protection Agency (EPA) roadway air dispersion modeling codes: CALINE4, CAL3QHC, and CAL3QHCR. Thank you for choosing CALRoads View. Lakes Environmental has put a lot of effort to create the easiest to use and most stable interface on the market.

This chapter gives you a brief description of the CALRoads View interface and the CALTRANS and EPA models. It also shows you how to install CALRoads View on your computer and introduces the basic components of CALRoads View to allow a quick start into the interface.

Contents
- The CALTRANS CALINE4 Model
- The U.S. EPA CAL3QHC Model
- The U.S. EPA CAL3QHCR Model
- The CALRoads View Program
- Installing CALRoads View
- The CALRoads View Window
- Menu Bar
- Toolbar Buttons
- Using Online Help
- Getting Technical Support

The CALTRANS CALINE4 Model

CALINE4 is a line source air quality model developed to assess air quality impacts of Carbon Monoxide (CO), Nitrogen Dioxide (NO2), inert gases (such as SF6) and suspended particles near roadways. The CALINE4 model was developed by the California Department of Transportation (CALTRANS).

- The original CALINE4 Model allows for up to 20 links and 20 receptors.
- The model can predict pollutant concentrations for receptors located within 500 meters of the roadway.
- CALINE4 can be used to model multiple sources and receptors, curved alignments, or roadway segments with varying emission factors.
- CALINE4 has special options for modeling air quality near intersections, street canyons, and parking facilities.
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The CALRoads View Window

CALRoads View’s window components follow the standard Windows features. For more information on standard Windows commands, see your Windows documentation.

The components of the CALRoads View window are:

- **Control Menu box**: The Control Menu box displays options for sizing, switching to another application, or closing the CALRoads View program.
- **Title bar**: Displays the interface name, CALRoads View, and between brackets the full path and name of the current project in use.
- **Toolbar buttons**: These are a series of buttons that provide a fast method of selecting some of the menu commands.
- **Close button**: Closes the CALRoads View program.
- **Minimize button**: Minimizes the CALRoads View window.
- **Maximize button**: Maximizes the CALRoads View window to occupy the entire screen, or restore to its pre-maximized size and position.
- **Color Ramp**: Displays the number of colors selected from the Contour Options dialog box.
- **Links-Receptors toolbar**: This toolbar contains tools that will allow you to setup your modeling project. The tools available in this tab allow you to graphically define receptors, receptor grids, links and link groups.
- **Drawing Area**: This is the large white area of the main window in which your links and receptors are displayed graphically.
- **Scroll bars**: You can use the vertical and horizontal scroll bars to view other sections of the drawing area. Click on any portion of the scroll bar to scroll to the desired view.
- **Coordinates Panel**: This area displays the X and Y coordinates of the location where the mouse pointer is pointing.
Graphical Output Toolbar: Displays the contouring and posting of concentration results for all three models.

Axis Labels: X and Y-axis labels are placed on the top and left side of the drawing area. These labels display the real coordinate values for the modeling area.

Annotation toolbar: This toolbar contains tools that allow you to manage the contents of the drawing area and enhance the presentation of your modeling project. With these tools, you can draw, delete, select objects, zoom in and out of a section of the drawing area, control the display of overlays, change contour plot options, and import backdrop maps. The Annotation toolbar can be docked or floating. See the description below of each one of these tools.

Tree View: This area displays a summary of the options, link and receptor data that has been specified for your project.
☐ Site Domain Boundary. This is the gray dashed-line that indicates the limits of the modeling domain.

☐ Menu bar. Displays menu names. To open a menu, move the mouse over the menu name and then press the left mouse button. A drop-down menu appears displaying a list of related commands.

**Menu Bar**

The following is the description of each menu option:

**File View Import Export Data Run Contours Tools Help**

**File (Alt, F)**

- **New Project...** Displays the Create New CALRoads Project dialog box, where you specify the name and location for the new CALRoads View project file (*.CLV).
- **Open Project...** Displays the Open CALRoads Project dialog box, where you specify an existing CALRoads project file (*.CLV) to open.
- **Save Project As...** Displays the Save Project As dialog box, allowing you to save the current CALRoads View project with a different name and/or in a different location.
- **Close Project** Closes the CALRoads View project that is currently open and returns to the initial window.
- **Import Model Input** Displays the following submenu options:
  - **CALINE4...** Imports a CALINE4 Input File.
Contents Displays CALRoads View Help Contents from which you can select Help topics.

Team Displays information on the CALRoads View development team.

Technical Support Displays technical support options for Lakes Environmental Software.

Web Links Displays web links for product upgrades, free met data, Lakes web site, and other related links.

Register for Updates Displays options for registering your product online or printing out a fax registration form.

About Displays the copyright notice, authors, and version number for the CALRoads View program.

Toolbar Buttons

The toolbar buttons are shortcuts to some of the menu commands. The function of each one of these buttons is explained below and the equivalent menu bar command is indicated.

File | New Project Lets you create a new CALRoads View project (*.CLV).

File | Open Project Lets you open an existing CALRoads View project (*.CLV).

File | Print Displays the Print Preview dialog box, where you can preview what will be sent to the printer.

Run | Status Displays the Project Status dialog box, where you can run the model and verify if any of the input parameters were not specified.

Data | Job Options Displays the Options dialog box, where you can specify or verify information about model-specific Job Options, Meteorological Options, and Output Options.
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Data | Link Options ............... Displays the Link Options dialog, where you can specify single links and related parameter information.

Data | Group Link Options .......... Displays the Group Link Options dialog where you can specify a connected series of links and related parameter information.

Data | Discrete Receptors .......... Displays the Discrete Receptors dialog where receptor data such as location and height can be reviewed and edited.

Data | Grid Receptors .............. Displays the Grid Receptors dialog where you can define one or more receptor grids for your modeling site.

Data | Patterns (ETS Data) .......... Displays the Patterns for ETS Data dialog which allows you to specify Emissions, Traffic and Signalization data. Applicable only to the CAL3QHCR model, Tier II approach.

Help | Contents .................. Displays the CALRoads View Help Contents, from which you can select specific topics.

Using Online Help

The CALRoads View help system consists of several parts including:

Context Sensitive Help ........... The help system in CALRoads View allows you to jump to the most detailed help topic relating to a particular tool or dialog. This can be done in one of the following ways:

> Clicking the Help button in a dialog box.

> Positioning the mouse cursor over the tool or dialog of interest and pressing the F1 key on your keyboard.

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Chapter 2 - Tutorial - CALINE4

Before you jump right into CALRoads View, you might want to start with a simple tutorial. This tutorial will guide you through the basic steps to develop a project in CALRoads View using the CALINE4 model and assumes that you have some familiarity with air dispersion modeling.

Contents
- The Problem
- Creating the Tutorial Project
- Before You Start
- Defining the Job Options
- Defining the Met Options
- Defining the Output Options
- Defining the Link Options
- Defining the Receptors
- Running CALINE4

The Problem

Portions of a local road network have been slated for review and the local regulatory agency has requested that modeling be performed to provide an idea of any current pollution issues that may be present. Modeling in this tutorial will be performed using the CALINE4 model.

Creating the Tutorial Project

> How to Create the Tutorial Project:

Step 1: Click the Start button and select Programs > Lakes Environmental > CALRoads View, or double-click on the CALRoads View icon, if you have created a shortcut on the desktop.

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Step 2: The About box is displayed. Click the OK button.

Step 3: Select File | New Project from the menu or click on the New button. The Create New CALRoads Project dialog box is displayed.

Step 4: Select the Drive and the Directory (C:\CALROADS\TUTORIAL\CALINE4) and enter the File Name (TEST_1.CLV) for the tutorial project and click the Save button.

Step 5: After CALRoads View has setup the new project, you will see the following window:

![CALRoads View Start-Up Screen](image)

Make sure that CALINE4 is selected as the current model on the model toolbar.

![Model Toolbar](image)

Note: If you only want to browse this tutorial, we have included the CALINE4 tutorial project file, "TUTORIAL_1.CLV, in the installation directory (by default C:\CALROADS\TUTORIAL\CALINE4).

Before You Start

Before beginning to input data into your project, you should learn about the Preferences dialog box. Select File | Preferences from the menu to display the Preferences dialog box. The Preferences dialog box is set up as a "tree" menu. This allows you to navigate easily from one panel to another. The Preferences dialog box is where you can set global options for your projects. The following options are available:
Global Settings Panel:

- **Default Model for New Projects**: This option allows you to specify the default model for new projects as CALINE4, CAL3QHC, or CAL3QHCR. Although you specify here the default model for new projects, you can easily change the model, anytime during your project.

- **Default Unit for New Projects**: This option allows you to specify the default unit of measurement as Meters or Feet for new projects. Although you specify here the unit for new projects, you can easily change the unit of measurement, anytime during your project.

Model Limits Panel:

- **Model Location Tab**: In this tab, you can specify other executable files for the CALINE4, CAL3QHC, and CAL3QHCR models. You only need to specify executables for the above models if the number of links specified in your project is above the limit for the original model executables (see Table 2-1). In this case, you need to specify executables of these models that were recompiled to allow a higher number of links.

- **Storage Limits Tab**: In this tab, you can check the storage limits for each model and specify storage limits for the user-specified model executables. The storage limits for the original models are:

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. No. of Receptors</th>
<th>Max. No. of Links</th>
</tr>
</thead>
<tbody>
<tr>
<td>CALINE4</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>CAL3QHC</td>
<td>60</td>
<td>120</td>
</tr>
<tr>
<td>CAL3QHCR</td>
<td>60</td>
<td>120</td>
</tr>
</tbody>
</table>
Note: CALRoads View can run unlimited number of receptors by using its multi-run capability. If the Max. No. of Links allowed for each model are not compatible with your project needs, then you need to specify a recompiled executable that has capabilities to process an increased number of links.

Model Domain Panel:

Here you can specify the default model domain for new projects. In the case you would prefer to specify your own domain for each project, leave the Default Model Domain for New Project box unchecked.

Appearance Panel:

- **Hide Inactive Links**: Allows you to hide inactive links. By default inactive links are displayed in the Drawing Area in gray color.
- **Hide Inactive Receptors**: Allows you to hide inactive receptors. By default inactive receptors are displayed in the Drawing Area in gray color.
Page Layout Dialog:

In this panel you can specify the company and modeler name to be printed in the printout templates, and the line thickness of the template border. You can also control the printing of information, such as project title, company name, modeler name, date, model, pollutant, maximum concentration, and units.

Labeling Panel:

Your labeling options for printouts can be selected as the Default or User Defined. The User Defined option allows you to change the captions for each box in the printout template. Deleting the text in the box will delete the label title from that particular box.
Defining Job Options

Job Options, Met Options and Output Options are parameters that are specified in the Options dialog. The Job Options tab is the first tab in the Options dialog. In this tab you define project information such as Run Information, Run Type, Averaging Time, Surface Roughness Length, and other Job Parameters. Follow the steps below to define the Job Options for your project:

Step 6: Click on the toolbar button, and select the Job Options tab. You can also access the Job Options tab by the following methods:

a) Double-click on Job Options from the tree view menu along the left side bar, or

b) Select Data | Job Options... from the menu. The following Options dialog is displayed:
Step 7: At this point, you have two choices in how you would like to continue this tutorial.

**OPTION I**
If you are familiar with the CALINE4 model and its required parameters, you may prefer to go directly to Step 14 where a table containing all the required data is presented.

**OPTION II**
A more detailed description of each parameter will be given using the Job Options Wizard. Go to Step 8.

Step 8: Click on the Job Options Wizard. The Job Wizard dialog is displayed.

Step 9: Job Title - Here you specify a title appropriate to your project. The default Job Title given to your project is the location of where the project was saved. You can choose to change this title at any time.

Pollutant Type - In the CALINE model, you can model CO, NO2, Inert Gases (such as SF6) or Particulate Matter. For this tutorial, we will be modeling carbon monoxide (CO).

Leave the default title and select CO as the pollutant, and click on the Next button.
Step 70: Run Type – Here you specify the type of modeling run you want to perform.

In CALINE4, there are four run types:

1. **Standard (1-Hour Average)** – The model calculates 1-hour average pollutant concentrations at each receptor. This option requires the user to specify wind direction under the Met Options tab.

2. **Worst Case Wind Angle (1-Hour Average)** – The model calculates 1-hour average pollutant concentrations at each receptor. The model automatically calculates wind directions that produce the highest concentrations at each receptor location.

3. **Multi-Run (8-Hour Average)** – The model calculates 8-hour average pollutant concentrations at each receptor. This option requires the user to specify wind direction for each hour under the Met Options tab.

4. **Multi-Run / Worst-Case Hybrid (8-Hour Average)** – The model calculates 8-hour average pollutant concentrations at each receptor. The model automatically calculates wind directions that produce the highest concentrations at each receptor location.

   - For this tutorial, we want the model to calculate 1-hour average concentrations and to automatically calculate wind direction producing the highest concentrations.

   - Select Worst Case Wind Angle (1-Hour Average) option. Change the Run Title to WORST CASE and click the Next button.
Step 11: Surface Roughness Length - This is a measure of the amount of local air turbulence that affects the spread of the plume. This panel allows you to select common values for the surface roughness length coefficient or specify a user-defined value.

Note: By selecting the Additional Values button, you have access to a list of additional surface roughness values.

- Select Suburban (100 cm) and click the Next button.

Step 12: In this panel you define pollutant specific values for Settling Velocity and Deposition Velocity.

- Settling Velocity - This is the rate at which a particle falls with respect to its immediate surroundings. It is an actual physical velocity of the particle in the downward direction.
Deposition Velocity – This is a measure of the rate at which a pollutant can be absorbed or assimilated by a surface.

Deposition of carbon monoxide (CO) is negligible; therefore we will bypass the settling and deposition velocities by specifying 0.0 for both parameters. Click the Next button.

Step 13: The Altitude Above Sea Level is used to determine the rate of plume spreading.

Leave the default value of 0 m for the altitude above sea level and click the Finish button.

Step 14: The parameters specified in the Job Wizard dialog box are automatically displayed in the Job Options tab, and should look similar to the dialog box presented below.
Table 2-2: Job Options Parameters

<table>
<thead>
<tr>
<th>Step #</th>
<th>Field Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 9</td>
<td>Job Title</td>
<td>Tutorial Using CALINE4 Model</td>
</tr>
<tr>
<td></td>
<td>Pollutant Type</td>
<td>CO</td>
</tr>
<tr>
<td></td>
<td>Pollutant Name</td>
<td>Carbon Monoxide</td>
</tr>
<tr>
<td>Step 10</td>
<td>Run Type</td>
<td>Worst-Case Angle (1-Hour)</td>
</tr>
<tr>
<td></td>
<td>Run Title</td>
<td>WORST CASE</td>
</tr>
<tr>
<td>Step 11</td>
<td>Surface Roughness Length</td>
<td>Suburban (100 cm)</td>
</tr>
<tr>
<td>Step 12</td>
<td>Setting Velocity</td>
<td>0 cm/s</td>
</tr>
<tr>
<td></td>
<td>Deposition Velocity</td>
<td>0 cm/s</td>
</tr>
<tr>
<td>Step 13</td>
<td>Altitude Above Sea Level</td>
<td>0 ft</td>
</tr>
</tbody>
</table>

Click the OK button to close the Options dialog.

Defining Met Options

The CALINE4 model allows you to define 1 hour or 8 hours of meteorological data, depending on the Run Type you have selected. For this project we will define 1 hour of meteorological data since we previously specified the Run Type as Worst-Case Wind Angle (1-Hour).

Step 15: Click on the toolbar button and select the Met Options tab. You can also access the Met Options tab by the following methods:

a) Double-click on Met Options from the tree view menu along the left side bar, or
b) Select Data | Met Options from the menu. The following options will be displayed.

![Options Dialog – Met Options Tab](image)

**Step 16:** At this point, you have two choices in how you would like to continue this tutorial.

**OPTION I**
If you are familiar with the CALINE4 model and its required parameters, you may prefer to go directly to **Step 24** where a table containing all the required data is presented.

**OPTION II**
A more detailed description of each parameter will be given using the Wizard. Go to **Step 17**.

**Step 17:** Click on the Met Options Wizard in the Options dialog. The Met Wizard dialog is displayed.

**Step 18:** Wind Speed – In this panel you specify the worst-case wind speed for the area being modeled.
Enter 1 m/s for the wind speed and click the Next button.

Step 19: Atmospheric Stability Class - This is a measure of the turbulence of the atmosphere and is defined by letters A through G, with A representing the most unstable and G representing the most stable.

For this project we will consider stable conditions. From the drop-down list box, select the Atmospheric Stability Class F (6) – Moderately Stable. Click the Next button.

Step 20: Mixing Height – Mixing Height is defined as the altitude at which thermal turbulence occurs due to solar heating of the ground. The mixing height algorithm was included in the model primarily for the analysis of low traffic flow situations occurring during extended nocturnal low level inversions. A value of 1000 meters or greater should be used in case the user wants to bypass this algorithm.
- Leave the default value of 1000 meters for mixing height and click the Next button.

**Step 21: Wind Direction Standard Deviation** - Allows you to specify the statistical standard deviation of the wind direction, known as "sigma meta".

- Enter a Wind Direction Standard Deviation of 17.5 degrees and click the Next button.

**Step 22: Pollutant Background Concentration** - Allows you to specify the pre-existing background level of the pollutant concentration in the area of study. The model adds the pre-existing and modeled concentrations together to determine the total impact at each receptor.

- Enter an ambient background concentration of 3 ppm for CO and click the Next button.
Step 23: Ambient Temperature – Allows you to specify the air temperature, measured in degrees Celsius.

- Enter the Ambient Temperature of 15 deg Celsius and click the Finish button.

Step 24: The parameters specified in the Met Wizard dialog box are automatically displayed in the Met Options tab, and should look similar to the dialog box presented below:
Table 2-3: Met Option Parameters

<table>
<thead>
<tr>
<th>Step</th>
<th>Field Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>Wind Speed</td>
<td>1 m/s</td>
</tr>
<tr>
<td>19</td>
<td>Atmospheric Stability Class</td>
<td>F(6)</td>
</tr>
<tr>
<td>20</td>
<td>Mixing Height</td>
<td>1000 m</td>
</tr>
<tr>
<td>21</td>
<td>Wind Direction Standard Deviation</td>
<td>17.5 deg</td>
</tr>
<tr>
<td>22</td>
<td>Pollutant Background Concentration</td>
<td>3 ppm</td>
</tr>
<tr>
<td>23</td>
<td>Ambient Temperature</td>
<td>15 deg C</td>
</tr>
</tbody>
</table>

**Defining Output Options**

The Output Options for the CALINE4 model allow you to specify naming conventions for Link and Receptor IDs.

**Step 25:** If you are still in the Options dialog, click the Output Options tab. The following options are displayed:
Step 26: Link and Receptor ID Options – This determines the scheme for the identification of Links and Receptors in the Output File. By selecting these options you are requesting the model to use letter IDs and numeric IDs to identify Links and Receptors, respectively, in the output file.

- Click the **Output Options Wizard** in the upper right hand corner of the **Options** dialog. The **Output Wizard** dialog box is displayed.

- Verify that both boxes **Link ID Option** and **Receptor ID Option**, are checked. Click the **Finish** button.

- Click the **OK** button to close the **Options** dialog.
Defining Link Options

A link is defined as a straight segment of roadway having a constant width, height, traffic volume, and vehicle emission factor. The location of a link is given by the coordinates of the two endpoints of a link centerline.

In CALRoads View, you can specify links in two ways:

1. **Links (Single Links)**: Single Links are defined as links that are composed of only one segment. These links are treated as single objects in the drawing area and they can be selected individually for deleting, moving, and editing. Link parameters for Single Links are defined in the Link Options dialog that can be accessed by pressing the Link toolbar button.

   ![Graphical Representation of a Single Link]

   ![Link toolbar button]

2. **G-Links (Group Links)**: Group Links are defined as links that are composed of more than one segment. These links are treated as a group of objects in the drawing area, and they can be selected only as a group for deleting, moving, and editing. Link parameters for Group Links are defined in the Group Link Options dialog that can be accessed by pressing the G-Link toolbar button.

   ![Graphical Representation of Group Links]

   ![G-Link toolbar button]
Links can be defined in the following ways:

- Graphical Mode
- Text Mode
- Wizard Mode
- Import Mode

Step 27: Before we begin defining Links, verify that you are working in the appropriate units for this project.

- Click on the Units button in the upper right corner of the drawing area. Select Meters and click the OK button.

Step 28: At this point, you have two choices as to how you would like to continue this tutorial.

**OPTION I**
This option provides all the necessary data to define links in text mode. Go directly to Step 37 where a table containing all the required data is presented.

**OPTION II**
This option provides a description on how to define Links graphically. Go to Step 29.

Step 29: To assist you in defining links graphically, we will be importing a base map in DXF file format. This base map contains a graphical representation of the roadway and nearby buildings.

- Select Import I Base Maps I DXF... from the menu or click on the Map Import Tool ( ). The Import DXF Base Map dialog box is displayed.
Click on the **Specify File** button ( ), and select **TUTORIAL_1.DXF** from the \CALROADS\TUTORIAL\CALINE4 folder. Click the **Open** button. After the data has loaded, click the **OK** button to close the **Import DXF Base Map** dialog box.

**Step 30:** Now we need to adjust the project domain to encompass all the contents of the DXF map. We do this by selecting the **Site Domain** tool ( ) from the Annotation Toolbar or selecting **View I Site Domain** from the menu. The **Site Domain** dialog box is displayed.

On the **Site Domain** tab, specify the SW Corner as -1000, -1000 and the NE Corner as 2200.0, 2200.0. Click the **OK** button to close the **Site Domain** dialog box. Your Drawing Area should look similar to below:
Step 31: **Group Links** are defined as links that are composed by more than one segment. As you can see from the DXF base map, the roadway to be defined is continuous. In this case, we will use the **Group Links** tool.

- Click on the **Group Links** tool on the Links-Receptor Toolbar.

Step 32: Using your mouse, left click on the Group Link Starting Point on the Drawing Area. Drag your mouse to left click at the next link node (turning point). Left-click at each node until you reach the Group Link Ending Point. Right-click the mouse to open the **Group Link Options** dialog box.

Step 33: The parameters that you specified graphically are automatically displayed in the **Group Link Options** dialog box, and should look similar to the dialog presented below:
**Step 34:** Origin – This is the X and Y coordinates for the first endpoint for the group link.

- Adjust the origin coordinates to \(-707, -707\).

**Step 35:** Link Type – Allows you to specify the type of roadway that the Link represents. Below is a brief description of each one of the six link types.

1. **At-Grade** links assume the roadway to be at ground level (Link Height = 0 m). In this case the model does not allow the plume to mix below ground level.

2. **Depressed** links assume that the depth of the depression is indicated as a negative value.

3. **Fill** links cause the height to be set automatically to zero. This assumes that the wind streamlines follow the terrain in an undisturbed manner. If you want to model a link that is slightly elevated above ground, the At-Grade option is more appropriate.

4. **Bridge** links assume that the wind is blowing not only over the link, but also under the link in a relatively undisturbed manner. The height is defined as the height of the roadway above the surrounding terrain.
5. Parking Lot: CALINE4 can model micro scale impacts from an at-grade parking facility. The user should model the planned access ways as a series of links and then determine an overall link emission factor (including excess transient cold start emissions).

6. Intersection links are used to model controlled intersections. A CALINE4 intersection link must encompass the acceleration and deceleration zones created by the presence of the intersection. Each link can treat only one direction of traffic flow. This way, a full intersection will require four links to be defined.

- For this tutorial, all Links are at ground level. From the Default Values frame, select the At-Grade option as the Link Type.

Step 36: Link Height – Defined as the height of the link above the surrounding terrain. If the link height is greater than 16 m (elevated terrain), the height should be specified as 10 m. If the link height is less than -10 m (depressed section), the height should be specified as -15 m.

- Since our roadway is at ground level, At-Grade, specify 0.0 m for Link Height.

Step 37: Mixing Zone Width – Defined as the region over the traveled way (traffic lines not including shoulders) plus 3 meters on either side. The mixing zone width should be no less than 10 meters (32.81 feet).

- Specify 28.0 m as the Mixing Zone Width (22 m of roadway width + 6 m).
Step 38: The **Apply** button in the Default Values frame, allows you to apply the Link Type, Link Height, and Mixing Zone Width to all of the Links within the Group Link.

- Click the **Apply** button.

Step 39: Please refer to Table 2-4 for the parameters defined under the **Link Geometry** tab in the Group Link Options dialog. You may choose to adjust your End Node coordinates according to Table 2-4.

### Table 2-4: Group Link Parameters

<table>
<thead>
<tr>
<th>Link ID</th>
<th>End Node X Coord.</th>
<th>End Node Y Coord.</th>
<th>Link Type</th>
<th>Link Height [m]</th>
<th>Mixing Zone Width [m]</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0.0</td>
<td>At-Grade</td>
<td>0.0</td>
<td>28.0</td>
</tr>
<tr>
<td>Link_2</td>
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<td>175.0</td>
<td>At-Grade</td>
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<tr>
<td>Link_3</td>
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<td>350.0</td>
<td>At-Grade</td>
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<td>28.0</td>
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<tr>
<td>Link_4</td>
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<td>1350.0</td>
<td>At-Grade</td>
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<td>28.0</td>
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<tr>
<td>Link_5</td>
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<td>1510.0</td>
<td>At-Grade</td>
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<td>28.0</td>
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<td>Link_6</td>
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<td>1640.0</td>
<td>At-Grade</td>
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<td>Link_7</td>
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<td>28.0</td>
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<td>Link_8</td>
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<td>Link_9</td>
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<tr>
<td>Link_10</td>
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<td>1850.0</td>
<td>At-Grade</td>
<td>0.0</td>
<td>28.0</td>
</tr>
</tbody>
</table>

Step 40: The **Link Activity** tab is where you define the **Hourly Traffic Volume** and the **Composite Emission Factor** for each Link segment.

- Select the **Link Activity** tab.

**Hourly Traffic Volume** – Here you specify the number of vehicles per hour (vph) anticipated to travel on this link.

**Composite Emission Factor** – Here you specify the weighted average emission rate of the local vehicle fleet in grams per mile per vehicle (g/v-mi).

- Under the Default Values frame, specify 8500 vph for **Hourly Traffic Volume**. Specify 30 g/v-mi for **Composite Emission Factor**. Click the **Apply** button.
to apply those values to all the links. Click the OK button to close the Group Link Options dialog.

Defining Receptors

Receptors are defined as locations close to the roadway where pollutant concentrations caused by mobile sources are to be defined. Receptors can exist as part of a grid or as discrete receptors. Receptors are usually placed at a height of 1.8 m (6.0 ft) above ground, i.e. the breathing zone. A receptor should be located outside the "mixing zone" of a roadway. The mixing zone is the total width of the travel lanes of a roadway plus 3 meters (10 feet) on either side.

Step 41: In the case that you did not import the DXF, you should go back to Step 29 & Step 30 for instructions. If you already imported the DXF, you may go ahead to Step 42.

Step 42: Discrete Receptors are individual receptors that are not part of a grid. Discrete Receptors are usually used when there is a need to identify the pollutant concentration at specific points. In our tutorial, we will place discrete receptors close to the buildings located along the roadway.

> Click on the Discrete Receptors tool on the Links-Receptor Toolbar.

> On the drawing area, click the location you would like to anchor your discrete receptor. The DXF base map we imported contains four small boxes close to the buildings. These are there to act as receptor locations. Click the left mouse...
button where you would like to place the first receptor. The **Discrete Receptors** dialog is displayed. Click the **OK** button and define the remaining receptors.

**Discrete Receptors** should be placed at these locations.

**Discrete Receptors Dialog**

**Step 43:** If you want, you can adjust the data presented in the **Discrete Receptors** dialog to the data presented in **Table 2-5**.
Table 2-6: Discrete Receptor Parameters

<table>
<thead>
<tr>
<th>#</th>
<th>ID</th>
<th>X Coord. [m]</th>
<th>Y Coord. [m]</th>
<th>Height [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rupt_1</td>
<td>410</td>
<td>1710</td>
<td>1.8</td>
</tr>
<tr>
<td>2</td>
<td>Rupt_2</td>
<td>110</td>
<td>1510</td>
<td>1.8</td>
</tr>
<tr>
<td>3</td>
<td>Rupt_3</td>
<td>210</td>
<td>1310</td>
<td>1.8</td>
</tr>
<tr>
<td>4</td>
<td>Rupt_4</td>
<td>110</td>
<td>360</td>
<td>1.8</td>
</tr>
</tbody>
</table>

► When you finish, click the OK button to close the Discrete Receptors dialog.

Step 44: We will also define a Receptor Grid that covers the entire modeling area. Each receptor will act as a discrete receptor.

► To specify the grid graphically, click on the Grid Receptors tool located on the Links-Receptor Toolbar.

► On the drawing area, click the location you would like to anchor your receptor grid. Hold down the left mouse button, drag the receptor grid along the entire domain in the drawing area. When you release the mouse button, the Grid Receptors dialog is displayed.

Step 45: Adjust the Origin (SW corner) (Ox, Oy) and the Spacing (Dx, Dy)

► In the Specify box, adjust the Origin (SW Corner) (Ox, Oy) to -800, -800 and the Spacing (Dx, Dy) in the X-Axis as 270.0 and in the Y-Axis as 280.0. Click the OK button. Your drawing area should look similar to below:
Running CALINE4

Step 46: You can now click on the toolbar button or select Run | Status... from the menu. The Project Status dialog is displayed. If the project is complete, you will receive the following message:

Your Project is COMPLETE. You Can Run Now !!!

- Select the Run button at the bottom of the Project Status dialog. A small dialog box appears, giving the status of the run.

Step 47: If your run finishes successfully, a message box is displayed asking if you would like to view the output file. You can see the produced output file by pressing the Yes button. The List of Output Files dialog box appears.
You can choose to view any one of the partial output files or preview the combined output file. Click on the Close button.

**Step 48:** Contours will be generated in the drawing area, similar to those below. This is the contour pattern associated with this particular traffic example.

See Chapter 5 for more information on the graphical output options and the Help Menu in CALRoads View.