

# LAB 10 - Cogo Intersection Commands

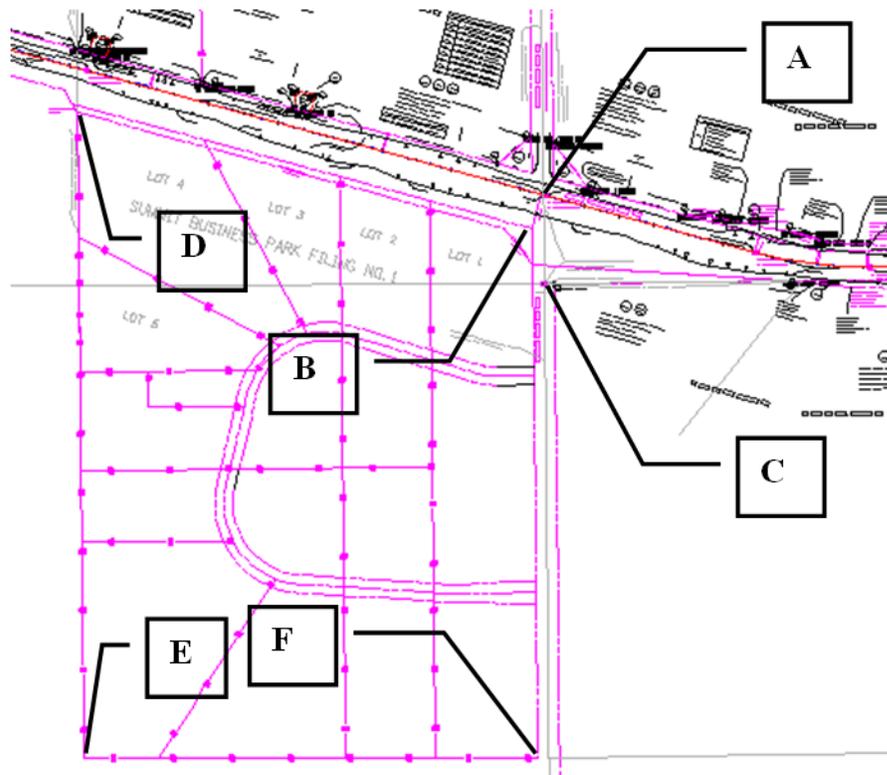
Development of right of way information can be facilitated using Cogo intersection commands. These Cogo points can then in-turn be used to define alignments (parcels). While this is a potential workflow, it is not necessary to first create Cogo points. It is simply one solution to establish required geometry information.

## Chapter Objectives:

- Create Cogo points through various Intersection Commands
- Generate Alignments from Cogo Points

In order, create Cogo points for:

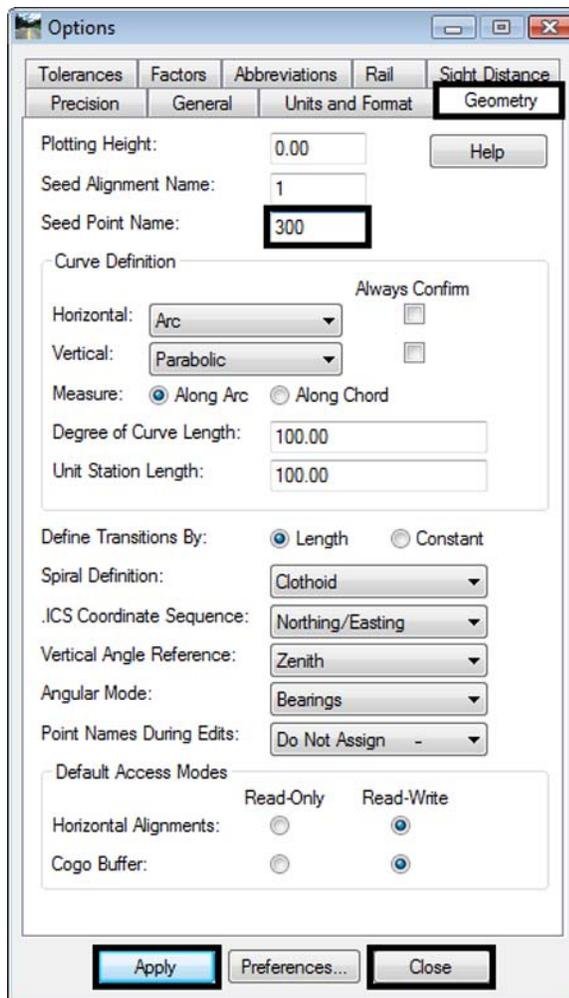
- ◆ A) The intersection of the design reference line and the west line of section 13, *“Lab 10.1 - Alignment-Alignment Intersection”*
- ◆ B) The NE corner of Summit Business Park, *“Lab 10.2 - Alignment - Alignment Intersection using Offsets”*
- ◆ C) A right of way point on the east side of County Road 303, *“Lab 10.3 - Direction - Alignment Intersection”*
- ◆ D) The NW corner of Summit Business Park, *“Lab 10.4 - Station & Offset”*
- ◆ E) The SW corner of Summit business Park, *“Lab 10.5 - Traversing”*
- ◆ F) The SE corner of Summit business Park, *“Lab 10.6 - Direction - Direction Intersection”*



## Lab 10.1 - Alignment-Alignment Intersection

Grouping Cogo point numbers together is desired. All Cogo points for these exercises are to start with point number 300 and automatically increment. Establish a Cogo point at the intersection of the project reference line with the west line of section 13. Two alignments exist representing these features: *C\_Centerline & West Line Sec 13*

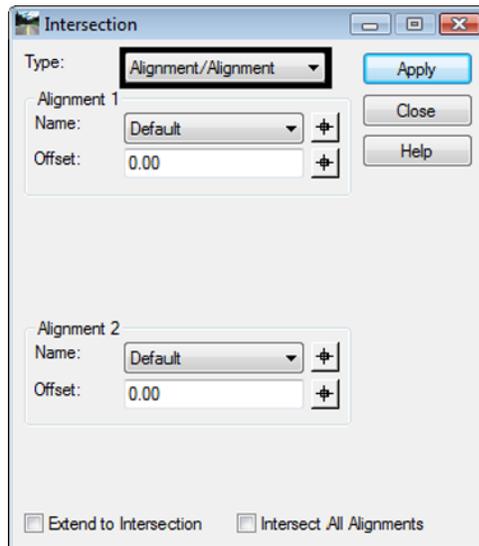
1. Select **Tools > Options > [Geometry]**
  - ◆ Input a *Seed Point Name* of **300**
2. <D> **Apply**
3. <D> **Close**



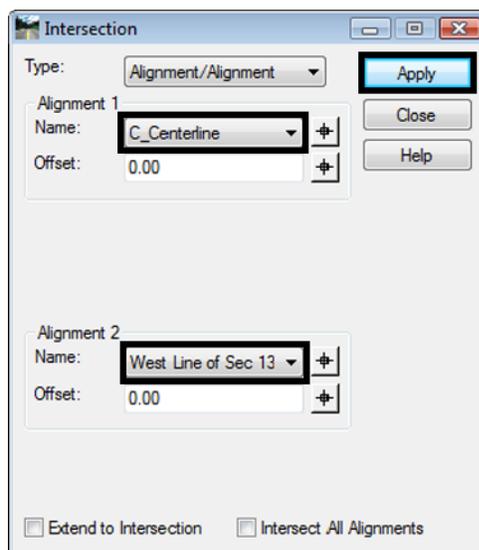
4. Select **Geometry > Locate > Intersection**

The Intersection dialog opens. The *Type* selection list defines typical Cogo intersection commands.

5. Select **Type: Alignment/Alignment**



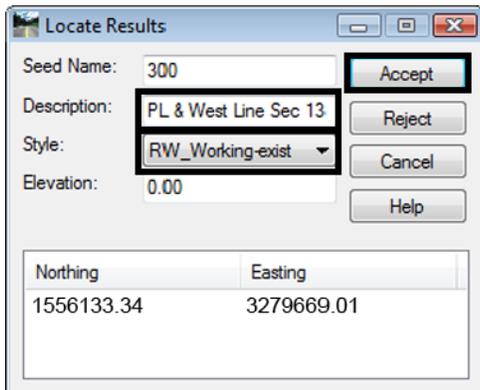
6. Complete the dialog as shown below.



**Note:** In addition to selecting the alignments to intersect, offsets can be defined. A negative sign (-) indicates an offset to the left.

7. <D> **Apply** - a results dialog opens if report lock is enabled.

- Key-in a **Description**, and choose a **Style** as shown.



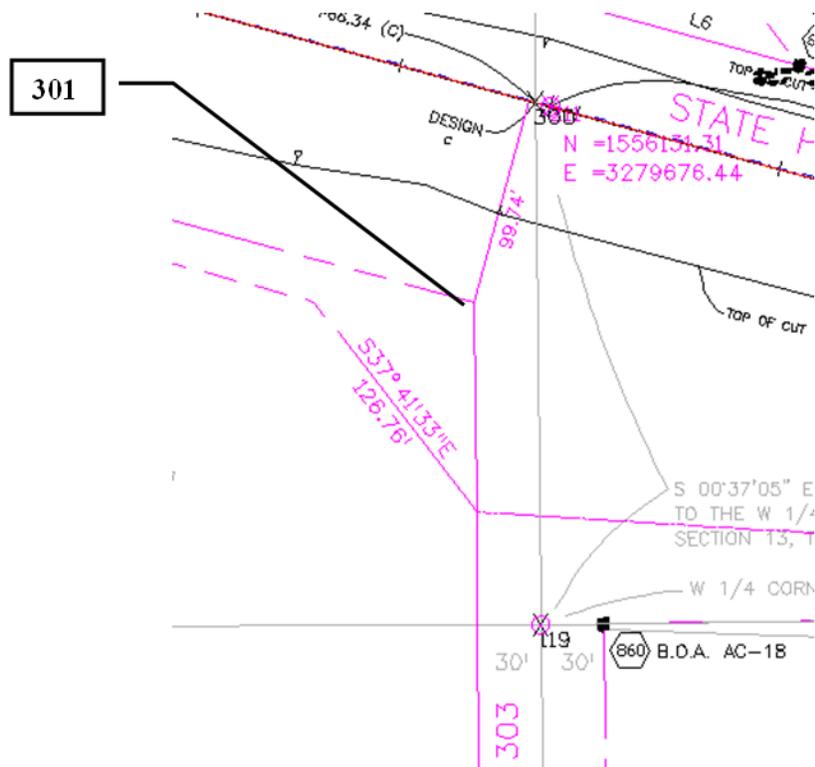
**Note:** If it is possible for the intersection command to provide another solution, selecting the Reject button will display the alternative results. Results are shown numerically in the dialog and dynamically on in the MicroStation screen.

- <D> **Accept** - the new Cogo point is created at the intersection.



## Lab 10.2 - Alignment - Alignment Intersection using Offsets

Use the intersection command to establish point 301 at the intersection of the south right of way of S.H. 86 and the west right of way of CR 303.

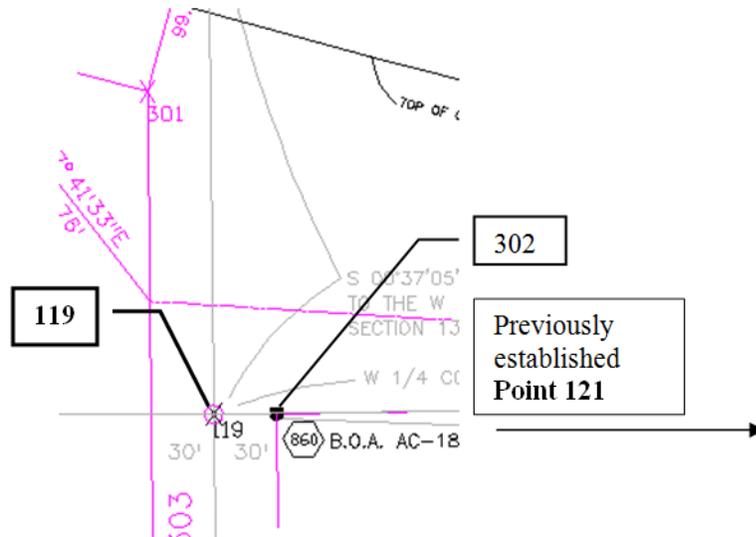


1. Select **Geometry > Locate > Intersection**
2. Complete the dialog as shown.



## Lab 10.3 - Direction - Alignment Intersection

Use the intersection command to establish point 302 on the east right of way of county road 303.



1. **Geometry > Locate > Intersection**
2. Complete the dialog as shown below:
  - ◆ **Type: *Direction/Alignment***
  - ◆ **Name: *119*** (origin point)
  - ◆ **Direction: *a 119 121*** (computes the bearing from point 119 to 121)
  - ◆ **Alignment: *West Line of Section 13***
  - ◆ **Offset: *30.00*** (to the right - positive)

Type:	Direction/Alignment	Apply
Direction Name:	119	Close
Northing:	1555884.03	Help
Easting:	3279671.70	
Direction:	a 119 121	
Offset:	0.00	
Alignment Name:	West Line of Sec 13	
Offset:	30.00	

Extend to Intersection     Intersect All Alignments

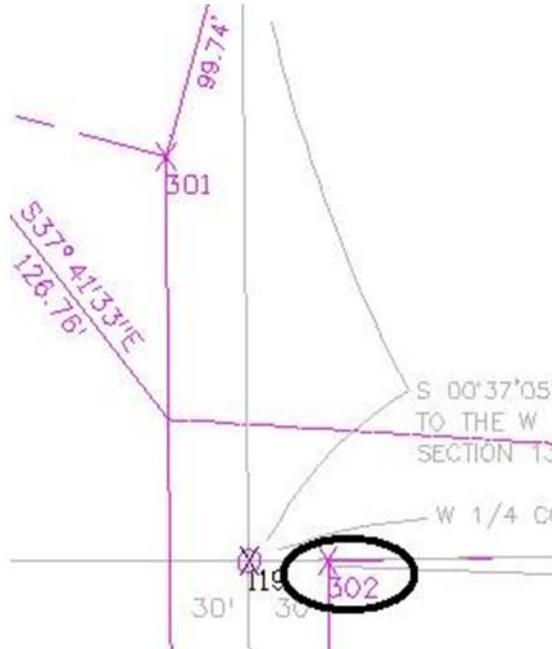
3. **<D> Apply**

The Locate Results dialog appears.

4. Seed name should reflect 302, if not, key it and a description in, and select a style.

Seed Name:	302
Description:	Existing RW @ CR 303
Style:	RW_ROW-Line_ex
Elevation:	0.00
Accept	Reject
Cancel	Help
Northing	Easting
1555884.45	3279701.70

5. <D> **Accept** - to create cogo point 302.

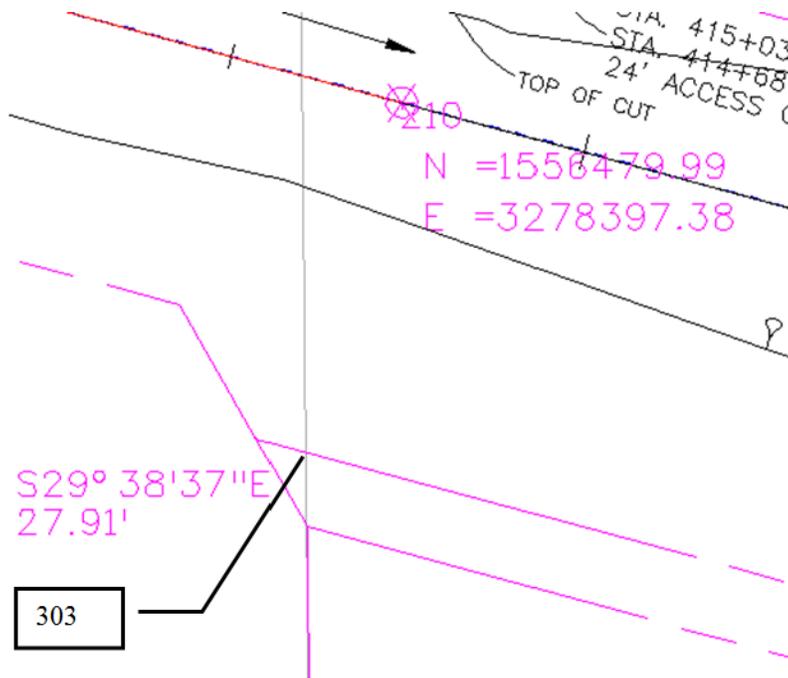


The limits of the adjacent subdivision, Summit Business Park, will be established. We had previously defined the NE corner of the plat at Cogo point 301.

- ◆ Establishing the plat boundaries will be done in the following order:
- ◆ Establish the NW corner by Station and offset
- ◆ Establish the SW corner by bearing & distance
- ◆ Establish the SE corner by intersection
- ◆ Create an alignment representing the subdivision boundary



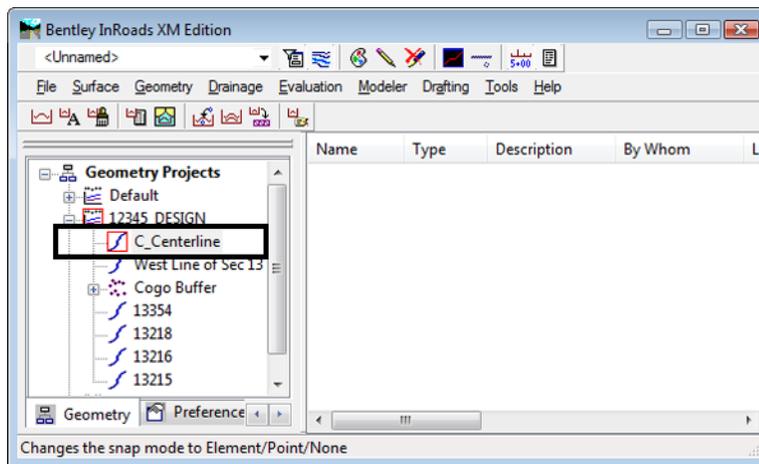
Establish a Cogo point at the NW corner of the subdivision.



A Cogo point is necessary at station A 414+48.30, 100.09' RT

The stationing for establishing point 303 is relative to the reference line C\_Centerline. The letter 'A' indicates this location falls within a station equation range.

1. Set **C\_Centerline** as the *active* horizontal alignment.



2. Select **Geometry > Horizontal Curve Set > Events**

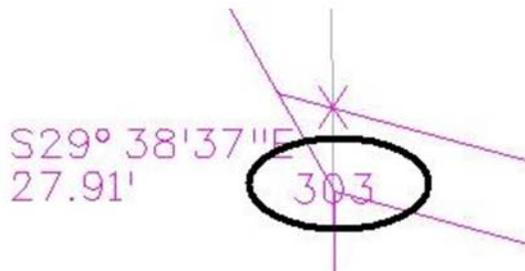
The Horizontal Events dialog is multi-functional; it provides the ability to enter:

- ◆ Event points relative to a horizontal alignment
- ◆ Generates points in the Cogo buffer
- ◆ Generates Cogo Points based on alignment vertices

3. In the **Add As** section: radio button *on Cogo Point*
4. Set **Define By** to: *Single Station*
  - ◆ Single Station - defines a location by station, offset definition
  - ◆ Single Point - defines locations by coordinate values
  - ◆ Multiple Stations - defines locations at a specified intervals and offsets
5. Key-in a **Seed Name**: *303*
6. Enter a **Description** and select a **Style** as shown.
7. Key-in **Station**: *A 414+48.30*
8. Key-in **Offset** *100.09*
9. <D> **Apply** - to create the Cogo point.

10. <D> **Close** to close the Horizontal Events dialog.

The cogo point is created.



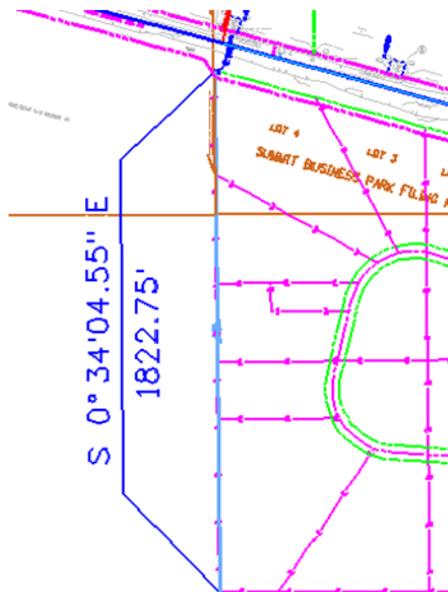
## Alternative Solution

1. Select **Geometry > Cogo Points > New**

The **Define By** field can be toggled between *Northing/Easting* and *Station/Offset*.

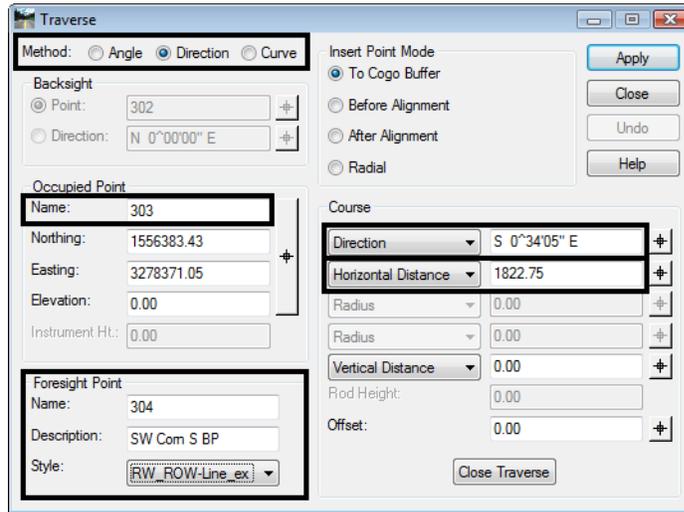
## Lab 10.5 - Traversing

Create a Cogo point to establish the SW corner of Summit Business Park by bearing and distance. The corner lies  $S 0^{\circ} 34' 04.55'' E$ , 1822.75 feet south of the NW corner of the plat.

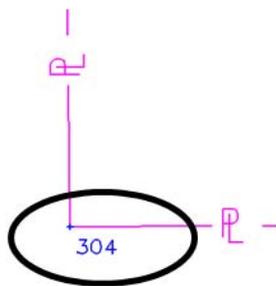


1. Select **Geometry > Traverse**

2. **Input** the data values as shown below.

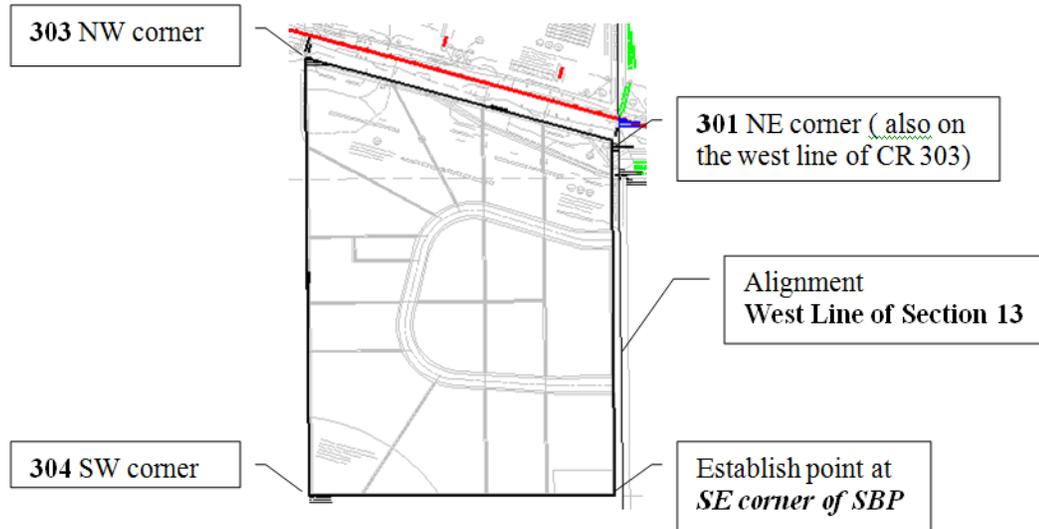


3. **<D> Apply** - to create a Cogo point at the Southwest corner of the plat.



## Lab 10.6 - Direction - Direction Intersection

Three of the four corners for the plat Summit Business Park are created. Only the SE corner remains. Establish the SE corner by intersection.



Criteria for establishing the SE corner:

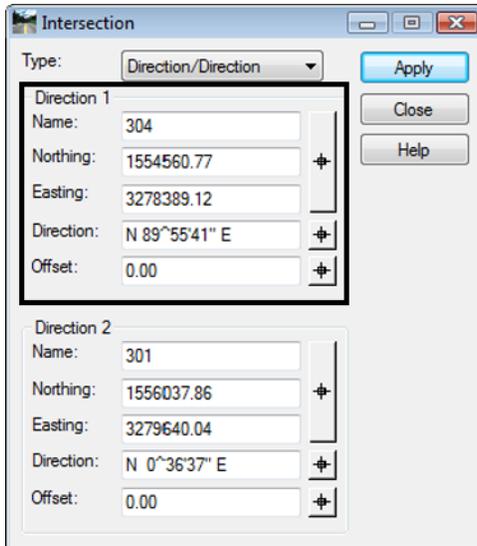
- The south line of the plat bears N 89 55 40.5 E
- The east line of the plat is parallel to the west line of Section 13

1. Select **Geometry > Locate > Intersection**
2. Set Type: **Direction/Direction**

### *Direction 1*

- **Name: 304**
- **Direction: Key-in N 89 55 40.5 E**

**Note:** The selection button on the dialog can be used to populate the Name (coordinate) fields. To select Cogo points the point snap must be toggled on. . Turn this lock off after use.

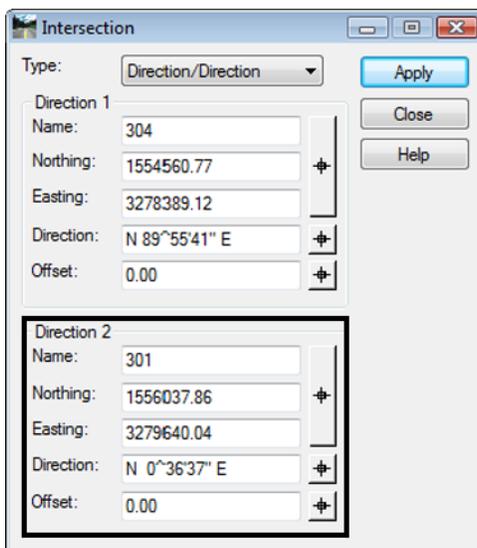


Intersection dialog box showing two directions. Direction 1 is highlighted with a black box. The fields for Direction 1 are: Name: 304, Northing: 1554560.77, Easting: 3278389.12, Direction: N 89°55'41" E, and Offset: 0.00. Direction 2 fields are: Name: 301, Northing: 1556037.86, Easting: 3279640.04, Direction: N 0°36'37" E, and Offset: 0.00. Buttons for Apply, Close, and Help are visible.

### Direction 2

- **Name:** 301
- **Direction:** Key-in *S 0 36 36.66 E* (SE or NW will both work)

**Note:** The Angular Precision set by **Tools > Options > [Precision]** affects the display of **Direction** input fields throughout *InRoads*. CDOT Preferences set the Angular Precision to 0, therefore an input of N 0 36 36.66 W will be reformatted by *InRoads* as N 0 36 37 W. The actual input will be used in the calculation.

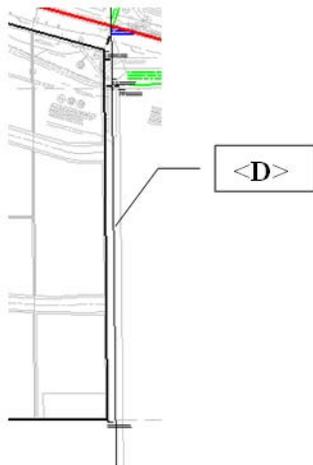


Intersection dialog box showing two directions. Direction 2 is highlighted with a black box. The fields for Direction 2 are: Name: 301, Northing: 1556037.86, Easting: 3279640.04, Direction: N 0°36'37" E, and Offset: 0.00. Direction 1 fields are: Name: 304, Northing: 1554560.77, Easting: 3278389.12, Direction: N 89°55'41" E, and Offset: 0.00. Buttons for Apply, Close, and Help are visible.

**Note:** The selection button on the dialog can be used to populate the Direction field. The required direction is parallel to the west line of section 13

To use the selection button for direction definition:

- Toggle on the Element lock
- <D> on the selection button
- <D> on the west line of the SW ¼ of Section 13



The direction of the identified geometry line populates the dialog.

1. Make sure both offsets are set to *zero*

## 2. &lt;D&gt; Apply

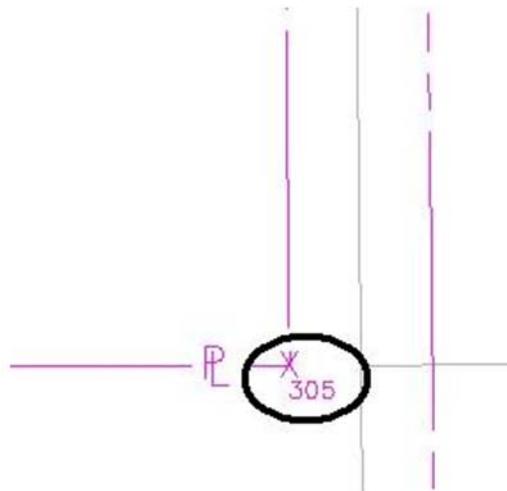
The Locate Results dialog appears.

**Enter:**

- **Seed Name:** 305
- **Description:** SE Cor SBP @ CR 303
- **Style:** RW\_ROW-Line\_ex

Northing	Easting
1554562.36	3279655.75

1. <D> **Accept** - to create the final Cogo point at the Southeast corner of the plat.



2. Toggle the geometry snap **Off**



**Note:** It is good practice to leave geometry snaps off except when explicitly required.

### Chapter Summary:

- Several methods for locating and creating cogo points were covered in this lab. The method(s) used depends on the design information that is available to work with.
- There are several formats for entering data in the direction field. Refer to pages 75 and 83 for two different examples.

- When entering stations it is not necessary to enter the “+” symbol. InRoads will place the symbol in the correct location when the numbers are entered.