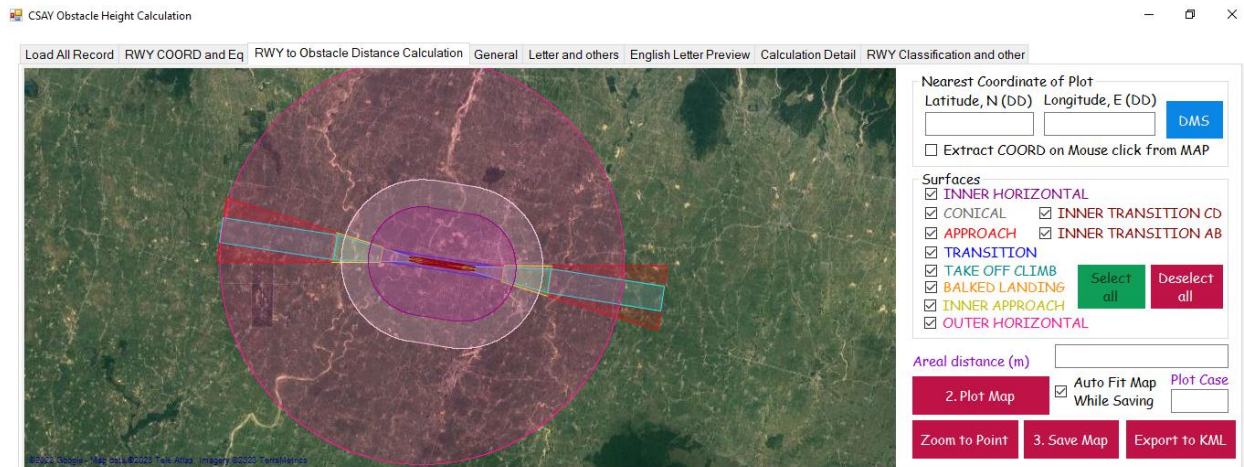


User Manual  
of  
CSAY OBSTACLE HEIGHT CALCULATION  
(Version 2023.1)  
(A Free Open-Source Software)

Based  
On  
OBSTACLE LIMITATION SURFACE  
(ICAO ANNEX – 14 VOL – I, 9<sup>th</sup> EDITION)



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2023

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## CHAPTER 1      DEFINITION

### 1.1 Definitions as per ICAO Annex 14

#### 1.1.1 Aerodrome

A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

#### 1.1.2 Balked Landing

A landing manoeuvre that is unexpectedly discontinued at any point below the obstacle clearance altitude/height (OCA/H).

#### 1.1.3 Aerodrome Reference point

The designated geographical location of an aerodrome

#### 1.1.4 Clearway

A defined rectangular area on the ground or water under the control of the appropriate authority, selected or prepared as a suitable area over which an aeroplane may make a portion of its initial climb to a specified height.

#### 1.1.5 Displaced Threshold

A threshold not located at the extremity of a runway

#### 1.1.6 Obstacle

All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that:

- a) are located on an area intended for the surface movement of aircraft; or
- b) extend above a defined surface intended to protect aircraft in flight; or
- c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.

### 1.1.7 Obstacle Free Zone (OFZ)

The airspace above the inner approach surface, inner transitional surfaces, and balked landing surface and that portion of the strip bounded by these surfaces, which is not penetrated by any fixed obstacle other than a low-mass and frangibly mounted one required for air navigation purposes.

### 1.1.8 Obstacle Limitation Surface (OLS)

It defines the limit to which objects may project into the airspace

### 1.1.9 Runway

A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.

### 1.1.10 Runway strips

A defined area including the runway and stopway, if provided, intended:

- a) to reduce the risk of damage to aircraft running off a runway; and
- b) to protect aircraft flying over it during take-off or landing operations.

### 1.1.11 Threshold

The beginning of that portion of the runway usable for landing.

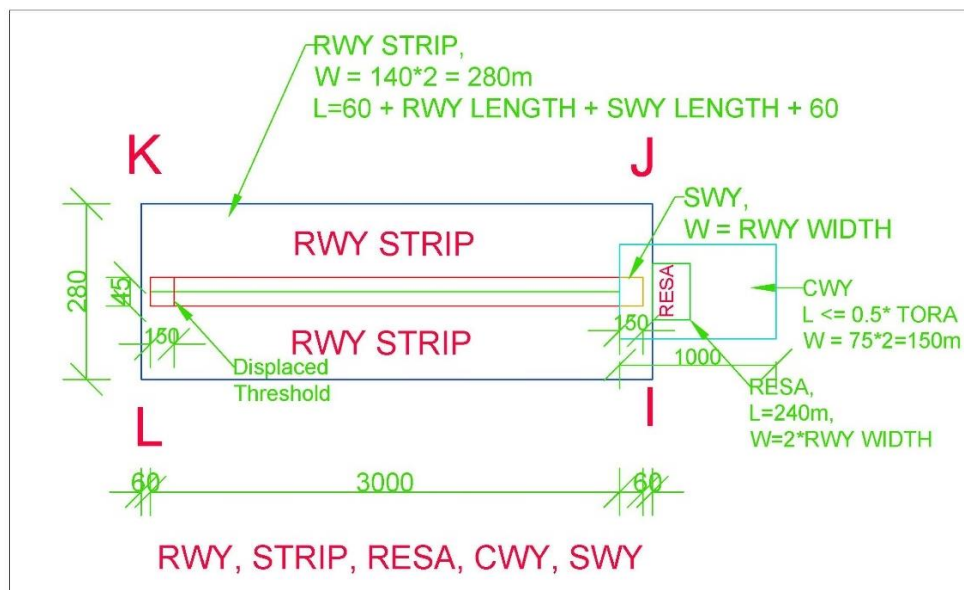


Figure 1. Rwy, Strip and other detail

## CHAPTER 2 OBSTACLE LIMITATION SURFACE

### 2.1 Types of Obstacle Limitation Surfaces

1. CONICAL SURFACE
2. INNER HORIZONTAL SURFACE
3. INNER APPROACH SURFACE
4. APPROACH SURFACE
5. TRANSITIONAL SURFACE
6. INNER TRANSITIONAL SURFACE
7. BALKED LANDING SURFACE
8. TAKEOFF CLIMB SURFACE
9. OUTER HORIZONTAL SURFACE

### 2.2 OLS requirement

Runway Category	Runway Sub-Category	Obstacle Limitation surface
Non-Instrument Runway		<ol style="list-style-type: none"> <li>1. Conical surface</li> <li>2. Inner Horizontal</li> <li>3. Approach surface</li> <li>4. Transitional surface</li> </ol>
Instrument Runway	Non-Precision Approach Runway	<ol style="list-style-type: none"> <li>1. Conical surface</li> <li>2. Inner Horizontal</li> <li>3. Approach surface</li> <li>4. Transitional surface</li> </ol>
	Precision Approach Runway Category I	<p>Mandatory Surfaces (Shall be)</p> <ol style="list-style-type: none"> <li>1. Conical surface</li> <li>2. Inner Horizontal</li> <li>3. Approach surface</li> <li>4. Transitional surface</li> </ol> <p><i>Optional Surfaces (Should be)</i></p> <ol style="list-style-type: none"> <li>1. <i>Inner Approach surface</i></li> <li>2. <i>Inner Transitional surface</i></li> <li>3. <i>Balked landing surface</i></li> </ol>
	Precision Approach Runway Category II or III	<ol style="list-style-type: none"> <li>1. Conical surface</li> <li>2. Inner Horizontal</li> <li>3. Approach surface</li> <li>4. Transitional surface</li> <li>5. Inner Approach surface</li> <li>6. Inner Transitional surface</li> <li>7. Balked landing surface</li> </ol>

- Note – 1: Take off climb surface shall be established for all runways meant of Take off climb.

## 2.3 Details of each OLS

In this document, calculations and drawings shall be based on “**PRECISION APPROACH RUNWAY CAT II OR III**” based on Table 4-1 Dimensions and slopes of obstacle limitation surfaces — Approach runways of ICAO ANNEX – 14, Vol – I, 9<sup>th</sup> Edition.

### 2.3.1 Conical Surface

Surfaces	Dimension
CONICAL	
Slope_%	5
Height_m	100

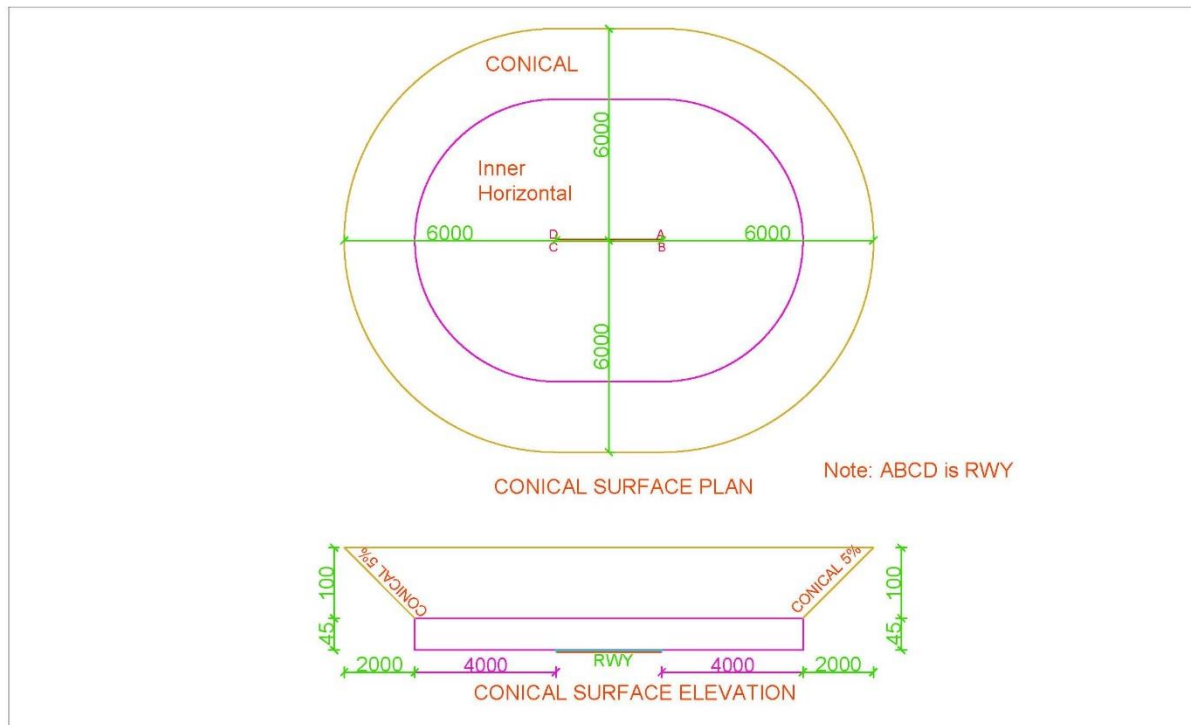


Figure 2. Conical Surface



### 2.3.2 Inner Horizontal Surface

Surfaces	Dimension
INNER_HORIZONTAL	
Height_m	45
Radius_m	4000

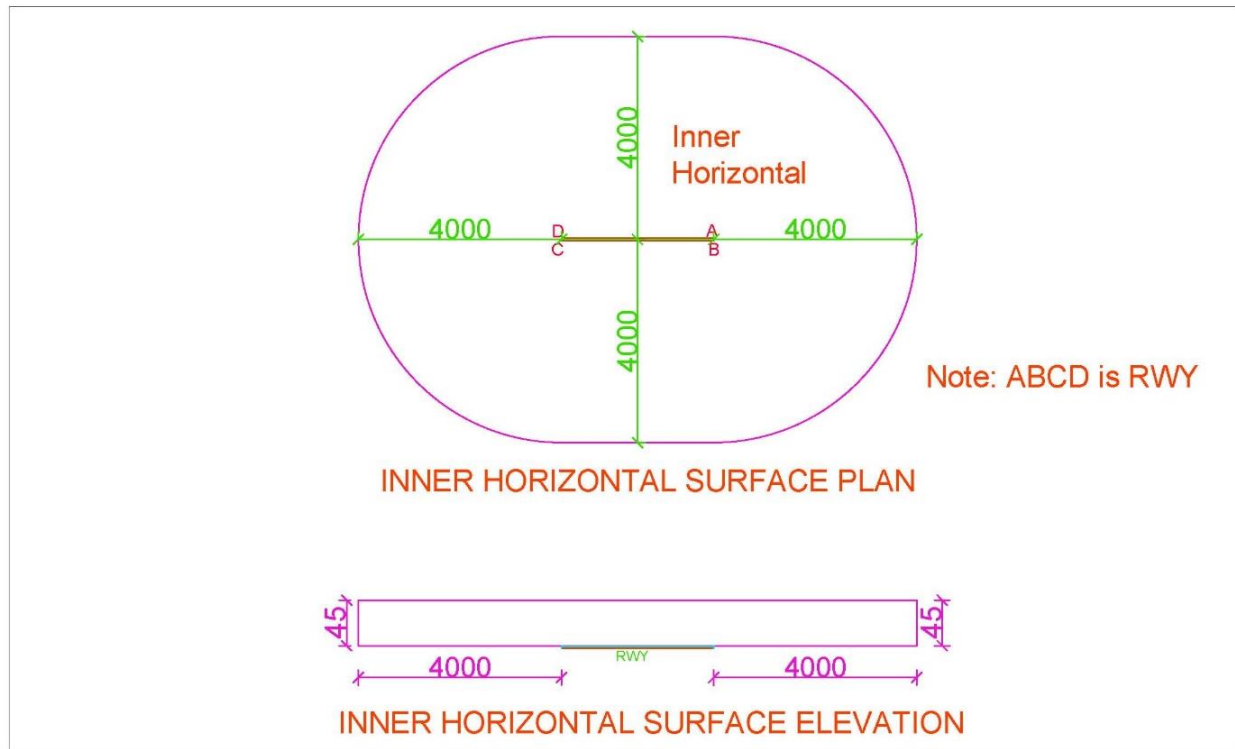


Figure 3. Inner Horizontal Surface

### 2.3.3 Inner Approach Surface

Surfaces	Dimension
INNER_APPROACH	
Width_m	120
Distance_from_threshold_m	60
Length_m	900
Slope_%	2

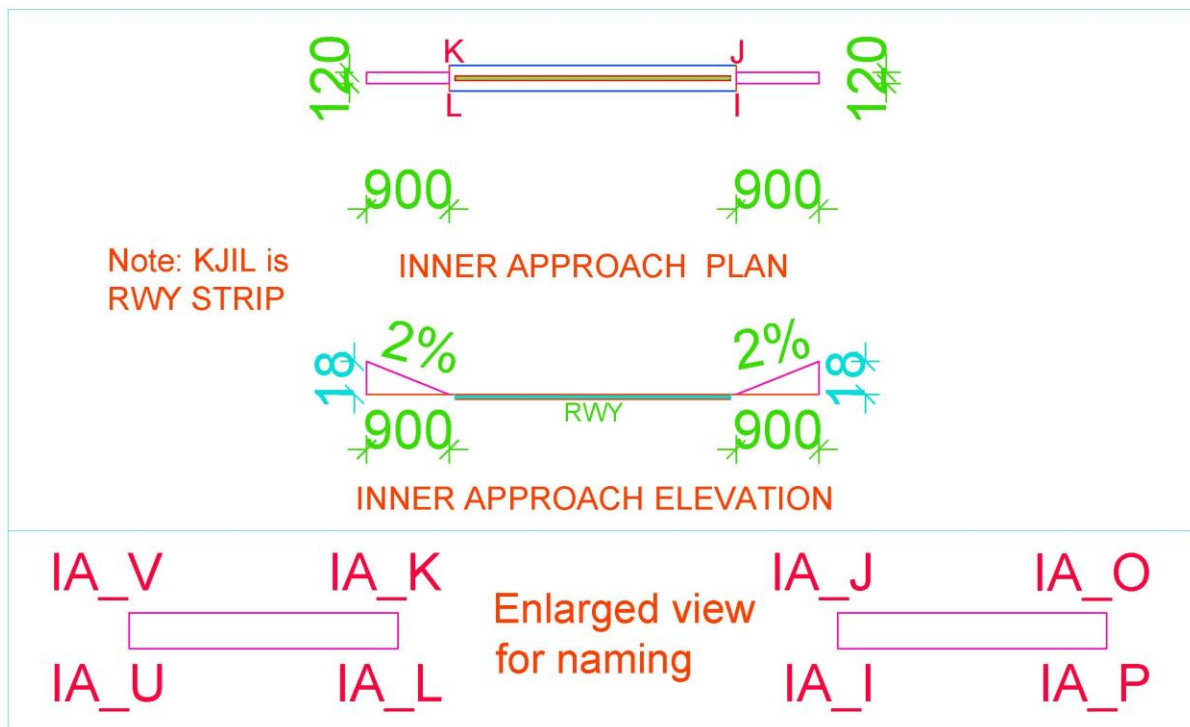


Figure 4. Inner Approach Surface

### 2.3.4 Approach Surface

Surfaces	Dimension	Surfaces	Dimension
Length_of_inner_edge_m	280	Second_Section	
Distance_from_threshold_m	60	Length_m	3600
Divergence_%	15	Slope_%	2.5
First_Section		Horizontal_Section	
Length_m	3000	Length_m	8400
Slope_%	2		

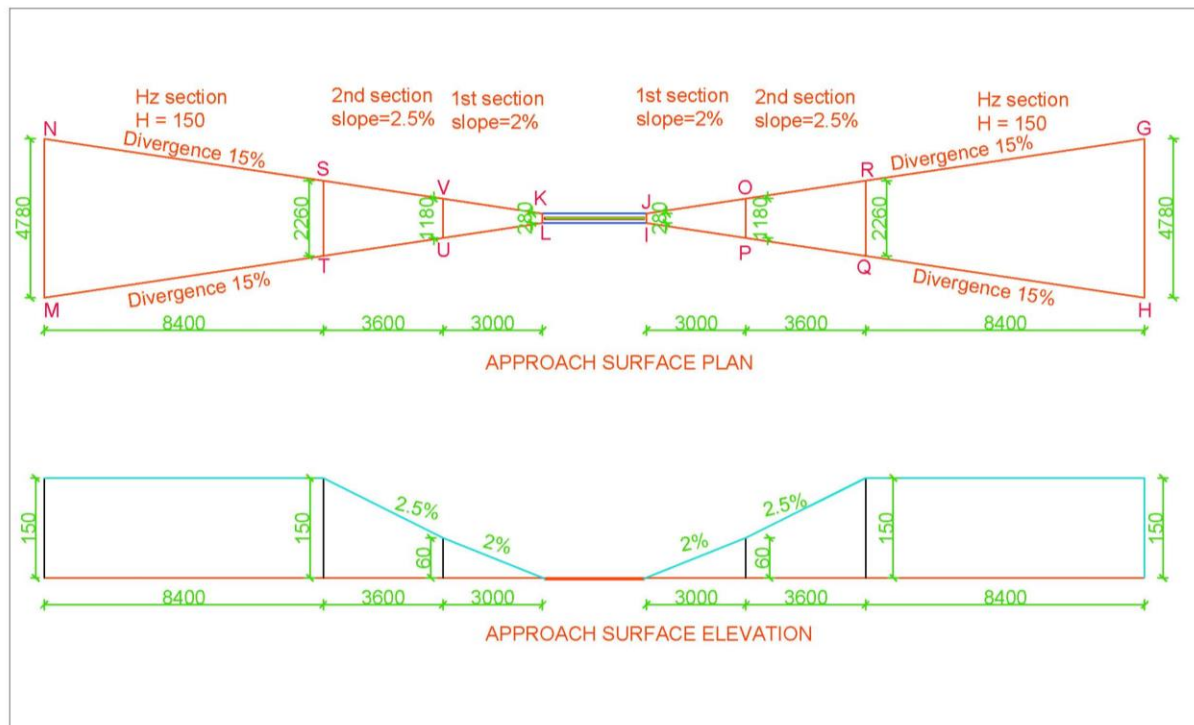


Figure 5. Approach Surface

### 2.3.5 Transitional Surface

Surfaces	Dimension
INNER_TRANSITIONAL	
Slope_%	14.3

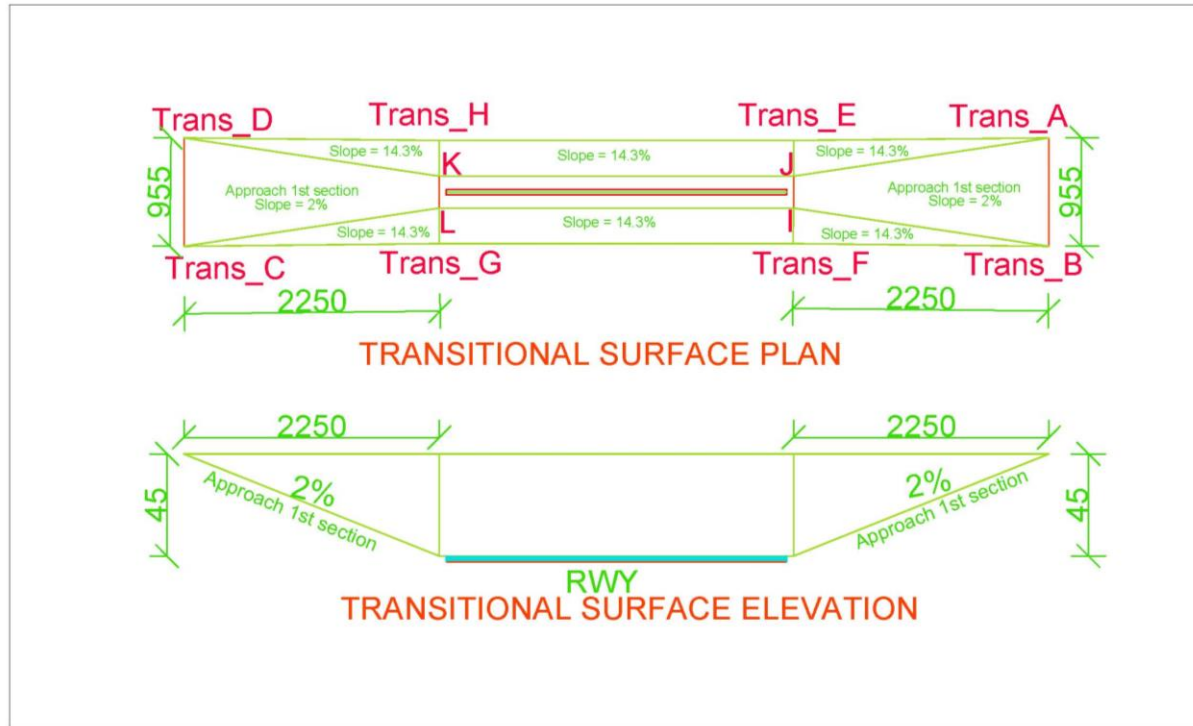


Figure 6. Transitional Surface

### 2.3.6 Inner Transitional Surface

Surfaces	Dimension
TRANSITIONAL	
Slope_%	33.3

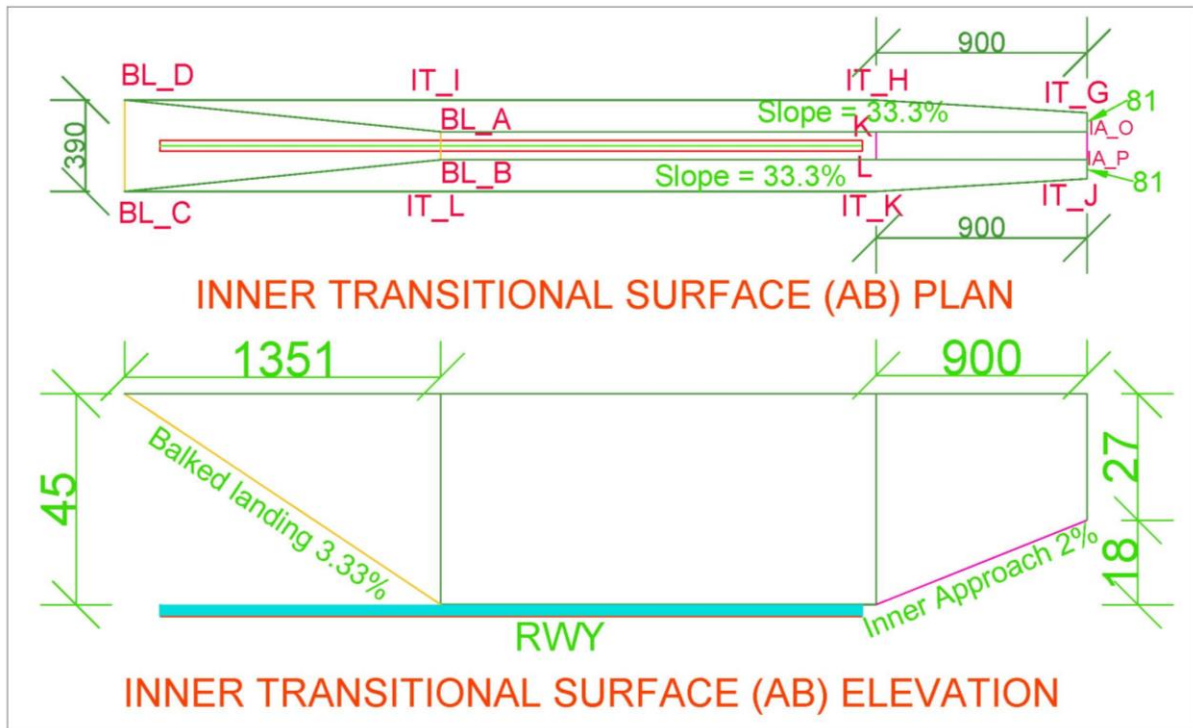


Figure 7. Inner Transitional Surface (AB Side)

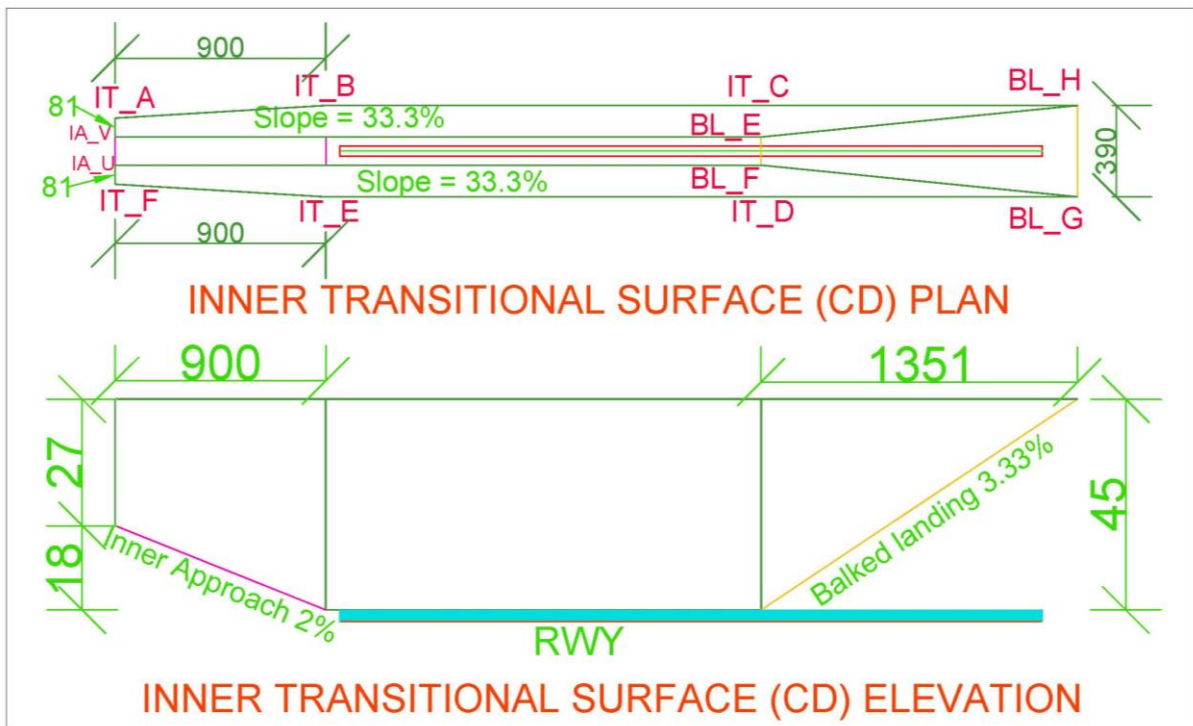


Figure 8. Inner Transitional Surface (CD Side)

### 2.3.7 Balked Landing Surface

Surfaces	Dimension
BALKED_LANDING	
Length_of_inner_edge_m	120
Distance_from_threshold_m	1800
Divergence_%	10
Slope_%	3.33

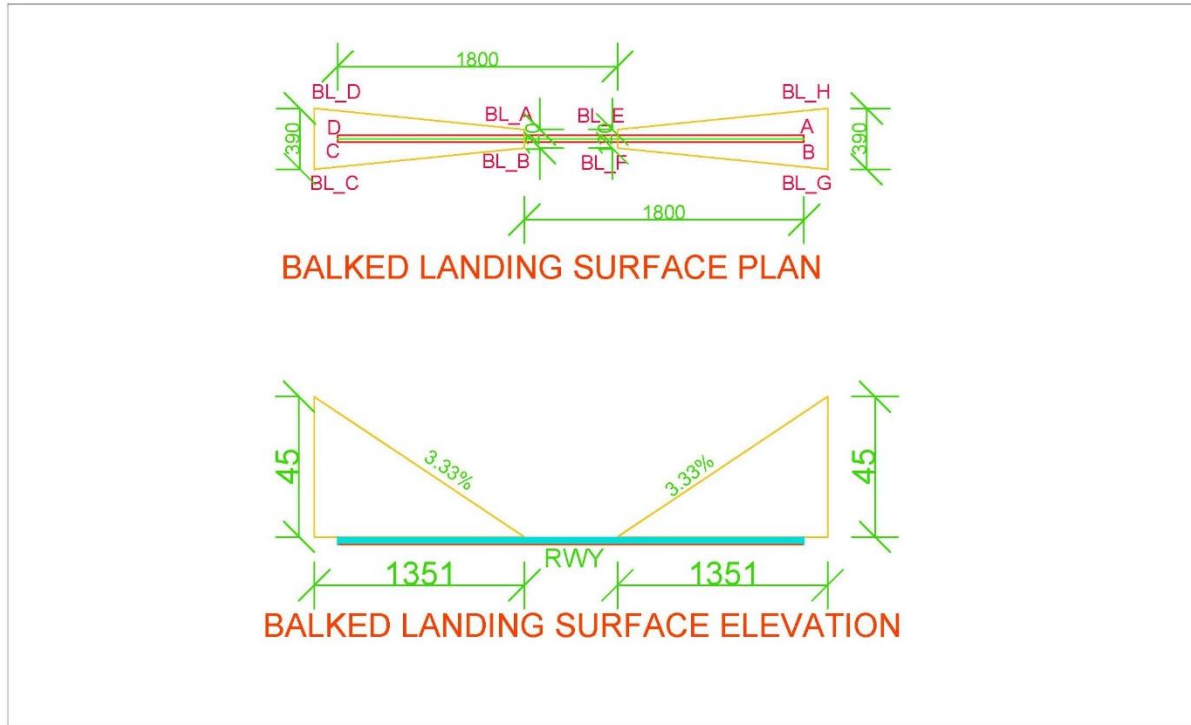


Figure 9. Balked Landing Surface

➤ Note:

- If threshold is displaced by distance 'd', Balked landing surface will also be displaced by distance 'd' in the direction of displaced threshold.
- In Figure 22, AB\_Threshold\_displaced\_By and CD\_Threshold\_displaced\_By shall be given value d1 and d2 respectively if Threshold AB is displaced by d1 and CD is displaced by d2.
- If thresholds aren't displaced, value will be zero

### 2.3.8 Take Off Climb Surface

Surfaces	Dimension
TAKE_OF_CLIMB_SURFACE	
Length_of_inner_edge_m	180
Distance_from_RWY_End_m	60
Divergence_%	12.5
Final_Width_m	1800
Length_m	15000
Slope_%	2

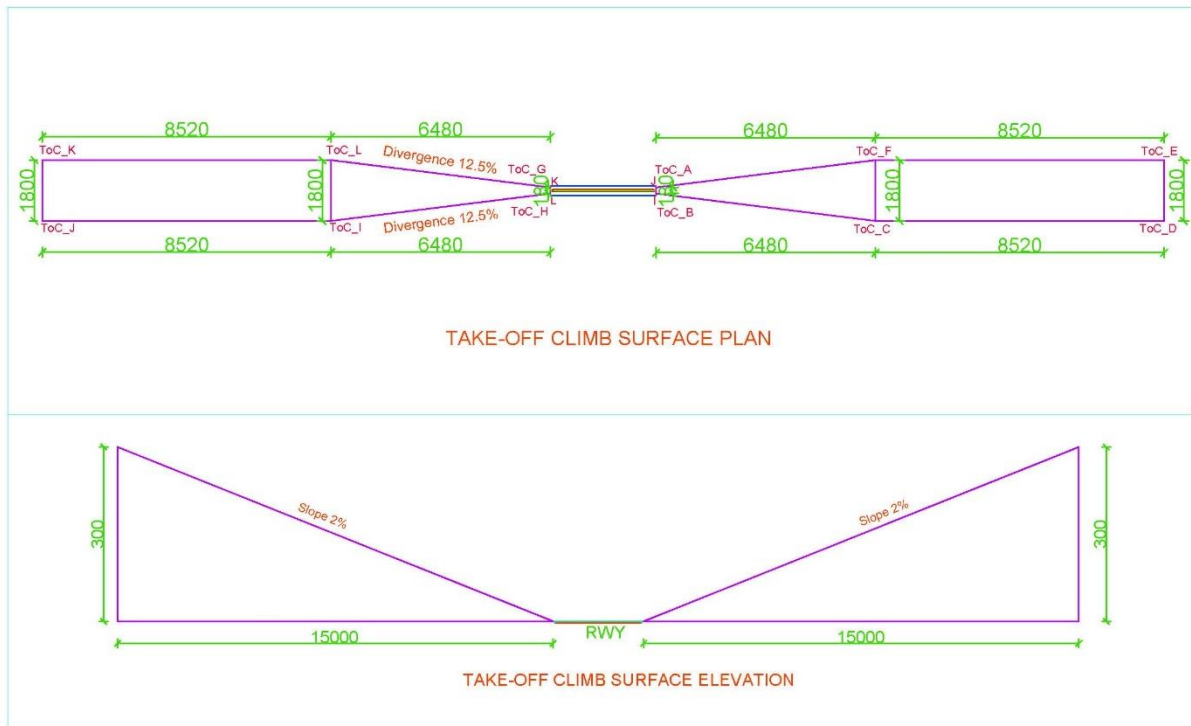


Figure 10. Take off Climb Surface

➤ **Note:**

- Take-Off Climb Surface starts from 60m end of runway (i.e. RWY strip) or end of clearway, whichever is greater.
- For example, as in Figure 1,
  - Distance of strip from RWY end ( $d_1$ ) = SWY + strip end =  $150+60=210\text{m}$
  - Distance of CWY from RWY end ( $d_2$ ) =  $1000\text{ m}$
  - Distance beyond strip end of CWY =  $1000-210=790\text{ m} = d$
  - This value i.e., 'd' is to be placed for respective end of runway in AB\_CLWY\_beyond\_strip and CD\_CLWY\_beyond\_strip as in Figure 22.

### 2.3.9 Outer Horizontal Surface

Surfaces	Dimension
Center at	ARP
Radius_m	15000

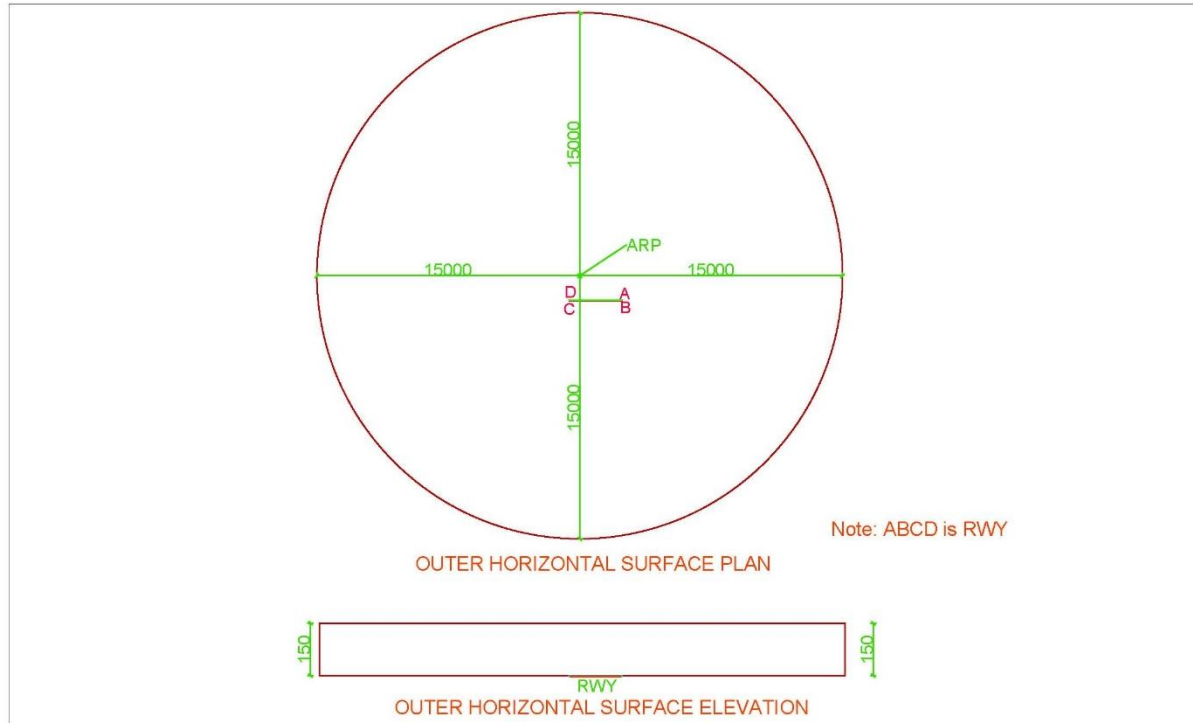


Figure 11. Outer Horizontal Surface



## CHAPTER 3 INTRODUCTION TO SOFTWARE

### 3.1 Overview of Software

Name of the Software	<b>CSAY Obstacle Height Calculation</b>
Version	2023.1
Type	Free and Open source
Operating System	Windows 10 (preferable) or higher
Display resolution of Monitor screen (Recommended)	1366 x 768
Setup	No installation required
Link to download	<a href="https://github.com/ajayyadavay/CSAYObstacleHeightCalculation">https://github.com/ajayyadavay/CSAYObstacleHeightCalculation</a>
Created/Developed/Programmed by	Er. Ajay Yadav
E-mail:	<a href="mailto:Civil.ajayyadav@gmail.com">Civil.ajayyadav@gmail.com</a>

### 3.2 Functions of Software

- 1) Finds the height of the obstacle
- 2) Generates OLS for any runway orientation of any country with correct input of Projection system of coordinate
- 3) Creates pdf of the report
- 4) Draws map of Obstacle Limitation surface and plotted point showing distance between runway and obstacle location
- 5) Creates tippani in Nepali and Letter in Nepali as well as English
- 6) Exports the route between runway and obstacle and their points to KML file
- 7) Allows user to Perform database operations: ADD, MODIFY, DELETE, DISPLAY, FILTER
- 8) Exports the saved/added data to excel
- 9) Allows user to Auto process which will generate report, tippani, letter, KML and Map saved in a folder
- 10) Allows user to enter decimal degrees (DD) of location of obstacle and also assists in converting from Degree, Minute and Second (DMS) format to DD.
- 11) Allows user to draw all the obstacle limitation surfaces or only selected surfaces
- 12) Allows user to extract coordinate (latitude and longitude) from map on mouse click

### 3.3 Limitation of Software

- 1) This software can be used for only one Runway and not for the parallel or intersecting runways
- 2) The inner transition surfaces use only one Reduced Level of Runway and not the nearest runway centerline Reduced Level. However, it will not affect the levelled runway.

### 3.4 Layout of Software

- 1) There are Eight Tabs
- 2) All the Text boxes labelled with black foreground is input and others are either calculated textboxes or loaded from the “\*.txt” files
- 3) For Auto process, input all required value and click “Auto Process” button
- 4) Textboxes with orange colored label in “General” tab are compulsory input
- 5) All the Combo Boxes have their values loaded from “\*.txt” files
- 6) Map is drawn in “RWY to obstacle distance calculation” tab

7) At bottom, there is “Menu” tab and “Filter” Tab.

### 3.5 Input Text files (“\*.txt”) and folder

All the text files contain data as per the name of the text files.

*Note: The user is allowed to only edit the content of text files strictly adhering to the format and user cannot rename or delete the text files or change the location of the text files.*

Figure 12 shows folders and its content. The user can edit content as per their requirement.

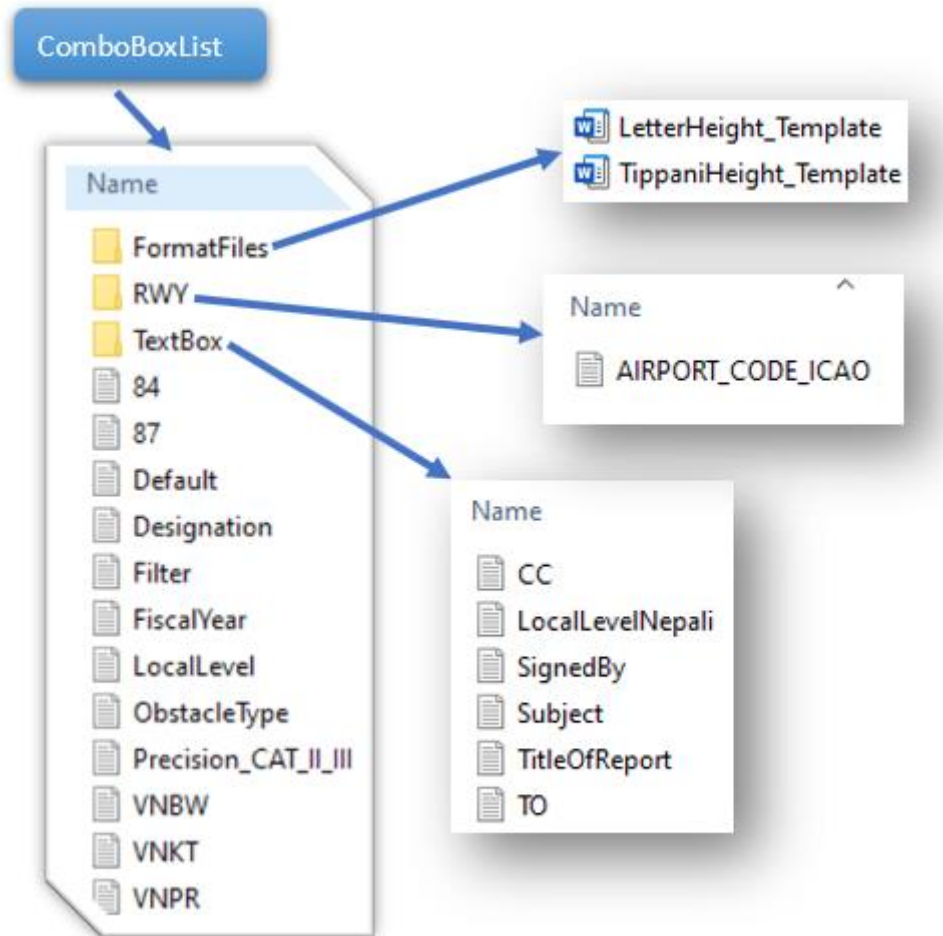


Figure 12. Input folder and its content

## 3.6 Content of Tab

### 3.6.1 Load All Record

CSAY Obstacle Height Calculation

Load All Record | RWY COORD and Eq | RWY to Obstacle Distance Calculation | General | Letter and others | English Letter Preview | Calculation Detail | RWY Classification and other

ID	FiscalYear	ObstacleType	PlotNo	FirstName	MiddleName	LastName	LocalLevel	WardNo	Tole	SurfaceNam	SurfaceHeig	Elevation
*												

Load All Record | Export Record To Excel | Total No. of Record loaded: 0 | Recent Activity: Obstacle Height Record Loaded Successfully

Figure 13. Load all Records Tab

### 3.6.2 RWY COORD and Eq

CSAY Obstacle Height Calculation

Load All Record | RWY COORD and Eq | RWY to Obstacle Distance Calculation | General | Letter and others | English Letter Preview | Calculation Detail | RWY Classification and other

Runway Coordinates

Point	Description	Latitude (N in DD)	Longitude (E in DD)	Easting (X in m)	Northing (Y in m)
A	RWY28 N	27.50288611	83.42583333	443288.988779625	3042267.72496712
B	RWY28 S	27.50248333	83.42576389	443281.92348993	3042223.14062149
C	RWY10 S	27.50661667	83.39575556	440320.128282438	3042695.07072369
D	RWY10 N	27.507025	83.395825	440327.207154289	3042740.26834965
E	RWY C	27.50268472	83.42579861	443285.456134778	3042245.43279431
F	RWY C	27.506820835	83.39579028	440323.667718363	3042717.66953667

Runway Map

Choose RWY: VNBW

Precision\_CAT\_II\_III

1. Load RWY Coord | Zoom to Fit

RUNWAY CLASSIFICATION: Precision Approach Category II or III Code No 4E

Figure 14. RWY COORD and Eq Tab

- 1) As in Figure 14, First enter the required data in specified format in text files as in Figure 12
- 2) Choose RWY
- 3) A text file of the same name (Here, it is VNBW) should be present in folder as in Figure 12
- 4) Click button "1. Load RWY Coord" and "Zoom to Fit" to fit.
- 5) As in Figure 12, the "default.txt" contains name of the Airport code which will be automatically loaded, if file exists, when the software opens.

### 3.6.3 RWY to Obstacle Distance Calculate

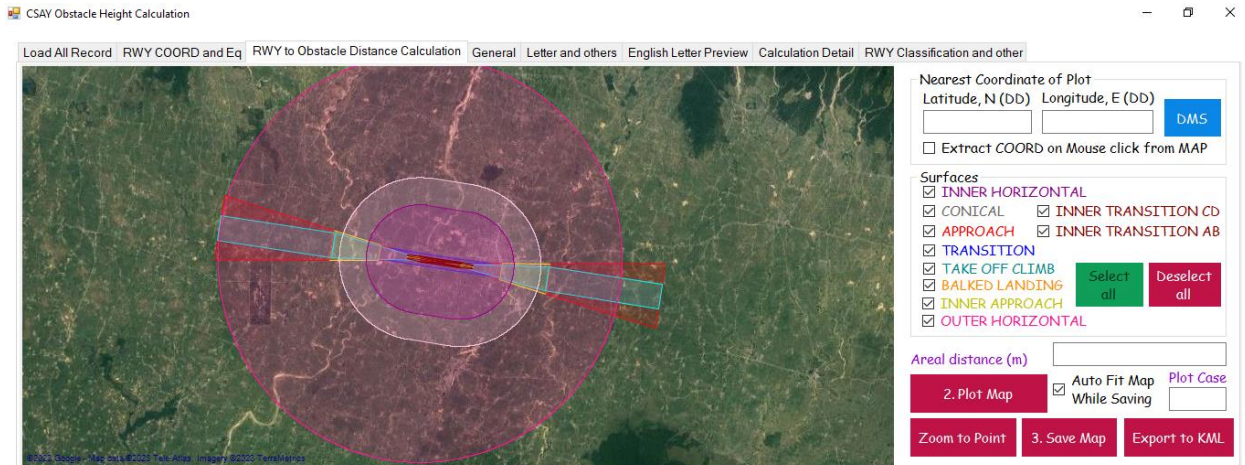


Figure 15. RWY to Obstacle Distance Calculate Tab

	Description	Degree	Minute	Second
▶	Latitude			
	Longitude			
*				

Latitude (DD)

Longitude (DD)

☒ Send DMS to Main Form

Figure 16. DMS to DD Converter

- 1) Input latitude and longitude in DD format.
- 2) Click DMS and enter latitude and longitude in DMS format as in Figure 16.
- 3) If “Extract COORD on mouse click from Map” is checked on, latitude and longitude text boxes will be filled the latitude and longitude of the map and if checked off, user has to input the coordinate themselves.
- 4) Under surfaces, select the required surfaces to display
- 5) Click button “2. Plot Map” to plot the obstacle and runway point and calculate areal distance

- 6) If “Auto Fit Map While Saving” is checked on, the map will be autofit to the points plotted and that map will be saved but if it is checked off, the user can adjust the map to desired zoom level by scrolling mouse wheel and then click “3. Save Map”
- 7) Click “Export to KML” to export the points of runway, obstacle and line joining them to KML file
- 8) “Zoom to Point” zooms map to the plotted point

### 3.6.4 General

CSAY Obstacle Height Calculation

Load All Record RWY COORD and Eq RWY to Obstacle Distance Calculation General Letter and others English Letter Preview Calculation Detail RWY Classification and other

**General**

ID  Fiscal Year (\*)  Obstacle Type  Plot no. (\*)

**Name**

Designation  First Name (\*)  Middle Name  Last Name

**Address**

Local Level (\*)  Ward no.  Tole

**Elevation of Proposed Obstacle**

RL of Plinth (AMSL)  Height above plinth  Elevation of obstacle (AMSL)  Permitted elevation of obstacle (AMSL)

**Coordinate of RWY**

Latitude, N (DD)  Longitude, E (DD)

Figure 17. General Tab

- 1) All orange label marked with (\*) are mandatory fields/textboxes
- 2) All black labelled fields are to be entered by user
- 3) Other are calculated or loaded from text files

### 3.6.5 Letters and others

CSAY Obstacle Height Calculation

Load All Record RWY COORD and Eq RWY to Obstacle Distance Calculation General Letter and others English Letter Preview Calculation Detail RWY Classification and other

**Letters and Others**

Date:-

To:  Municipality  Province  Nepal

Subject:  Regarding consent for building construction

Date of previous letter

Ref. no. of previous letter

Signed by:  Er. Cheif, CED

CC:  1. GM, .....Airport

Any Other info

Title of Report  International Airport Civil Aviation Office  Municipality  Civil Engineering Division  Obstacle Height Calculation Sheet

Fill Following text in Devanagiri script

निवेदनको मिति:-

प्राप्त निवेदनको मिति:-

प्राप्त निवेदनको च.नं.-

कित्ता नं.-

उचाई:-

बडा नं.-

स्थानीय तह:-

Preview English Letter Create Nepali Letter Create Nepali tippani

Figure 18. Letters and Others Tab

- 1) All black labeled are input
- 2) Blue colored fields are loaded form text files as shown in Figure 12.
- 3) No need to write in Devanagari script i.e., Nepali because when you input in English, these Devanagari fields will be automatically filled

- 4) “Preview English Letter” button will open “English Letter Preview” Tab as shown in
- 5) “Create Nepali Letter” and “Create Nepali Tippi” button will create letter and Tippi in the format contained in “FormatFiles” folder as shown in Figure 12.

### 3.6.6 English Letter Preview

CSAY Obstacle Height Calculation

Load All Record RWY COORD and Eq RWY to Obstacle Distance Calculation General Letter and others **English Letter Preview** Calculation Detail RWY Classification and other

To: ..... Municipality  
..... Province  
Nepal

Subject: Regarding consent for building construction

In response to the letter received from that office dated with ref. no. requesting consent for building construction, this is to certify that maximum permitted elevation of the proposed located at -, having plot no. of determined after studying the received drawings, Google Earth Map other related papers is m (AMSL). Furthermore, it is to notify that this permit has been granted in accordance with the standards stipulated in Obstacle Limitation Surface (OLS) under Civil Aviation Requirement-14 (CAR-14) on the condition that there shall be no further increment of height by permanent construction of structure or by installment of pole, tower, antenna or any other equipment without prior approval of this Authority.

Date:-

Er. v

[Documents required](#)

1. Letter from concerned local level requesting for building height clearance stating name, address and plot number of owner's land
2. Building site location, plan section showing elevation data signed by Consultant Engineer and Owner
3. Coordinate (latitude and longitude) of proposed building corners and Reduced Level (AMSL) of Ground/Plinth level of building
4. Map issued from Survey department showing owner's plot number

English letter To word File

Figure 19. English Letter Preview Tab

- 1) English letter will appear in the white text box on the left-hand side
- 2) Date, designation, obstacle elevation etc. will be automatically filled after calculation and you have input all the required data
- 3) “English letter To Word File” will export the content of the text box in word file so that you can edit if necessary

### 3.6.7 Calculation Detail

CSAY Obstacle Height Calculation

Load All Record RWY COORD and Eq RWY to Obstacle Distance Calculation General Letter and others English Letter Preview **Calculation Detail** RWY Classification and other

Calculation detail of all the surfaces under which the obstacle lies

SN	Surface Name	Surface Height	RL of Surface	Calculation
1	INNER HORIZONTAL	45.000	150.000	105 + 45.000 = 150.000
2	APPROACH - SECOND SECTION	72.315	177.315	105 + (60 + 2.5% * (492.603)) = 177.315
3	TAKE-OFF CLIMB SURFACE	69.852	174.852	105 + (2% * (3492.603)) = 174.852

Final Surface Calculation detail 105 + 45.000 = 150.000

Allowable Elevation

RL of RWY (AMSL) 105.000 Surface height above RWY 45.000 Elevation allowable (AMSL) 150.000

Surface INNER HORIZONTAL Central Reference Meridian 84

Figure 20. Calculation Detail

- 1) All the OLS below which the obstacle lies, will be listed with detailed calculation in the table as shown in Figure 20.
- 2) The minimum elevation data and corresponding surfaces will be shown in the text boxes and that shall be added to the table as shown in Figure 13.

### 3.6.8 RWY Classification and other

CSAY Obstacle Height Calculation

Load All Record RWY COORD and Eq RWY to Obstacle Distance Calculation General Letter and others English Letter Preview Calculation Detail RWY Classification and other

OLS dimensions

SN	Surface	Dimension
1	CONICAL	
2	Slope_%	5
3	Height_m	100
4	INNER_HORIZONTAL	
5	Height_m	45
6	Radius_m	4000
7	INNER_APPROACH	
8	Width_m	120
9	Distance_from_threshold_m	60
10	Length_m	900
11	Slope_%	2
12	APPROACH	
13	Length_of_inner_edge_m	280
14	Distance_from_threshold_m	60
15	Divergence_%	15

Displaced Threshold

AB Threshold displaced by (m) 0.0

CD Threshold displaced by (m) 0.0

ClearWay beyond Strip

AB ClearWay beyond strip (m) 0.0

CD ClearWay beyond strip (m) 0.0

ARP COORD

Latitude (N) 27.50661667

Longitude 83.39575556

Projection COORD Parameter of 84

a (m) 6378137.0 M0 (m) 0

1/f 298.2572201 Phi\_DD 0

K0 0.9996 False Easting (m) 500000.0

Figure 21. RWY Classification and other Tab

VNBW - Notepad

File Edit Format View Help

```

Central_Meridian      84
RL_RWY 105.000
RWY_Classify Precision_CAT_II_III
AB_Threshold_Displaced_by 0.0
CD_Threshold_Displaced_by 0.0
AB_CLWY_beyond_Strip 0.0
CD_CLWY_beyond_Strip 0.0
ARP_Lat_N 27.50661667
ARP_Long_E 83.39575556
Points Description Latitude (N) Longitude (E)
A RWY28 N 27.50288611 83.42583333
B RWY28 S 27.50248333 83.42576389
C RWY10 S 27.50661667 83.39575556
D RWY10 N 27.507025 83.395825
  
```

Ln 1, Col 1 100% Unix (LF) UTF-8

Figure 22. AirportCode.txt file Format

84 - Notepad

File Edit Format View Help

```

Everest_Nagarkot_MUTM84
a 6378137.0
1/f 298.2572201
K0 0.9996
M0 0
phi0_DD 0
False_Easting_X 500000.0
  
```



Figure 23. Ellipsoid data for a Central Meridian

- 1) "OLS dimensions" table contains data of file "Precision\_CAT\_II\_III.txt" as shown in Figure 12.
- 2) The name of the file containing data for "OLS dimension" table of Figure 21, should be same as that of RWY\_Classify as in Figure 22, i.e., "Precision\_CAT\_II\_III.txt".
- 3) "Displaced Threshold", "Clearway beyond Strip", "ARP COORD" shall be contained in file of {AirportCodeName.txt}; Here "VNBW.txt" as shown in Figure 22.
- 4) "Project COORD Parameter" contains data of projection system of different ellipsoid. As shown in Figure 22, Central Meridian is 84 so there should be a text file "84.txt" containing data of projection system as shown in Figure 12 and Figure 23.

### 3.6.9 Menu



Figure 24. Menu Tab

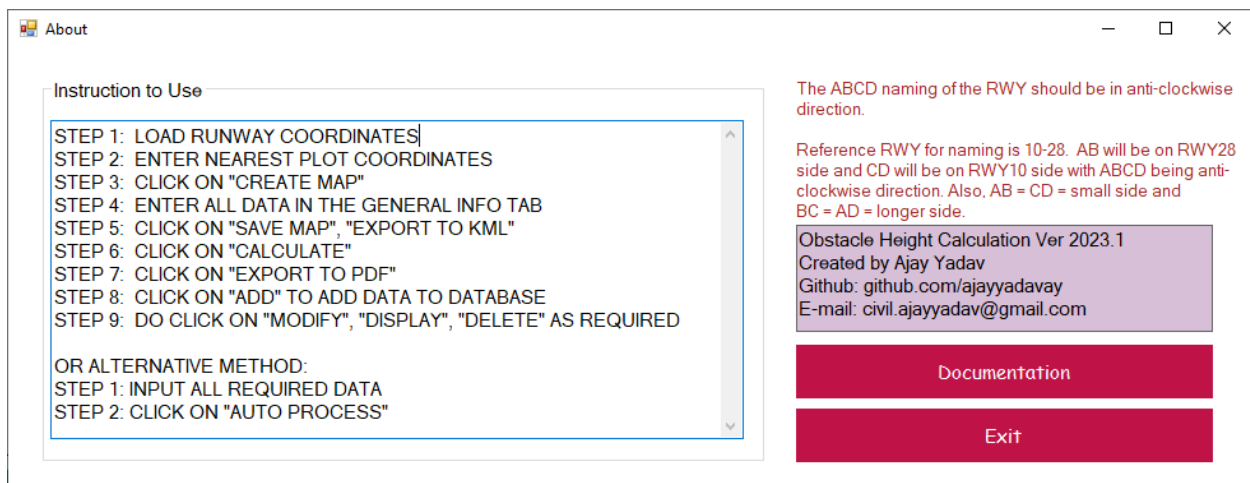


Figure 25. About

- 1) If chosen action is, Radio "Add" then button "Add" will be enabled and user will be allowed to add data and if chosen action is Radio "Modify, Display, Delete", then button "Delete", "Modify" and "Display" will be enabled and button "Add" will be disabled.
- 2) To Display, Modify and Delete, go to "General" Tab and enter ID
- 3) The ID can be known by clicking on button "Load All Record" of Figure 13
- 4) When the user click on "Add" button, all data are added to database and ID auto-increases.
- 5) Button "6. Export to PDF" will export the report to PDF.
- 6) All the projects are saved in Folder "ObstacleProjectFolders".



### 3.6.10 Filter

Menu Filter

Filter by (Column Name)  = < > Distinct Values

AND OR CLEAR FILTER

Figure 26. Filter Tab

- 1) Format of Filter is –
  - a. 'FirstName'='Alpha' OR 'LastName'='Yankee'
  - b. Those records will be shown in the table of Figure 13 having First name as 'Alpha' or Last Name as 'Yankee'

### 3.7 Nomenclature of Runway corners

- 1) The naming of corners of Runway corners shall be according to Figure 27.
- 2) Reference runway is RWY 10-28
- 3) Non-reference runway is any runway other than the reference runway i.e., RWY 10-28
- 4) To name any non-reference runway (i.e., runway other than RWY 10-28),
  - a. Draw the centerline runway edge strip rectangular line of reference and the non-reference runway
  - b. Rotate the reference runway i.e., RWY 10-28 about mid-point of centerline of RWY in such a that all the following conditions are satisfied-
    - i. AB should always be below the EW line
    - ii. CD should always be above the EW line
    - iii. ABCD should be in anti-clockwise direction
    - iv. AB and CD should be shorter sides i.e., along width of RWY
    - v. AD and BC should be longer sides i.e., along the length of RWY
  - c. Then get the latitude and longitude of corners A, B, C and D from google earth, GPS, etc. and write those coordinates Airport code text file (e.g., VNBW.txt, VNKT.txt, VNPK.txt, etc.) in the format specified as in Figure 22.

#### Note:

1. If the naming order is wrong or not as per specified, OLS cannot be drawn correctly.
2. Since the software code was written with respect to RWY 10-28 and parameters were then set for other runways so, RWY 10-28 is regarded as reference runway.

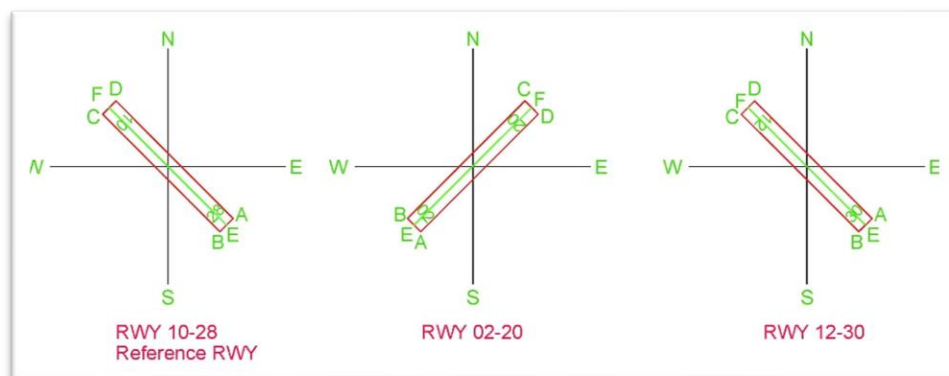
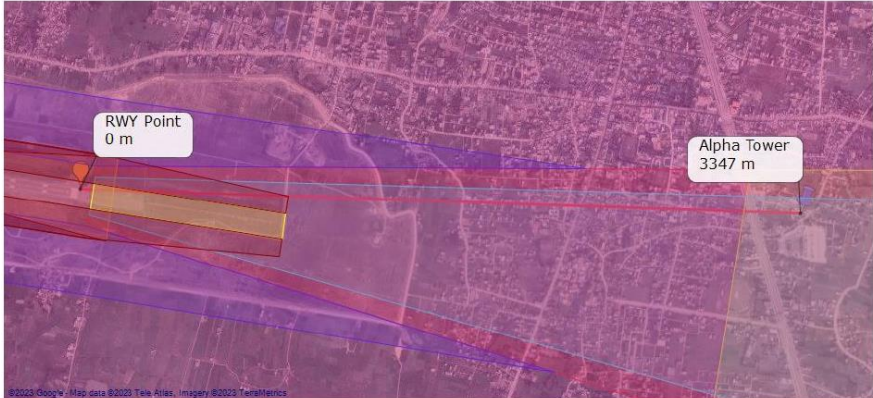


Figure 27. Runway corner nomenclature

## 3.8 Output

### 3.8.1 Report

..... International Airport Civil Aviation Office  
 ..... Municipality-, .....  
 Civil Engineering Division  
 Obstacle Height Calculation Sheet

A. General Information		
1	Obstacle Calculation ID	1
2	Fiscal Year	7980
3	Obstacle Type	Tower
4	Owner's Name	Alpha Yankee
5	Address	Tango Municipality - 11, Bravo
6	Plot number	123
7	Nearest Plot Coordinate	27.5018765576825, 83.4597015380859
8	Runway Coordinate	27.50288611, 83.42583333
9	Distance from RWY to Obstacle	3347.17 m
B. Elevation of Proposed obstacle		
10	RL of Plinth (AMSL)	135 m
11	Height of obstacle above Plinth	25 m
12	Maximum Elevation of Obstacle (AMSL)	160.000 m
C. Allowable Elevation of Obstacle		
13	RL of RWY (AMSL)	105.000 m
14	Obstacle lying in surface	INNER HORIZONTAL
15	Surface height above RWY	45.000 m
16	Allowable Maximum Obstacle Elevation	$105 + 45.000 = 150.000$
17	Hence, Maximum Permitted height of obstacle	150.000 m
D. Reference		
18	Runway Classification	Precision Approach Category II or III Code No 4E
19	Airport	VNBW
20	Docs referred	OLS Chart of ICAO Annex-14 Volume I, Chapter 4 and CAR-14
E. Google Earth Image showing RWY to Obstacle position		
		

### 3.8.2 Letter in Nepali

मिति: २०७७-००-००

श्री नगरपालिका  
नगर कार्यपालिकाको कार्यालय  
, नेपाल ।

विषय: भवन निर्माणका लागि सहमति सम्बन्धमा ।

उपरोक्त विषयमा त्यस कार्यालयको च.नं. ०००, मिति २०७७/००-०० को पत्रबाट माग भएको सिफारिस सम्बन्धमा, न.पा. वडा नं. ० ख, किता नं. ०,००,००० मा घर निर्माण गर्न भनी प्राप्त भएका भवन निर्माण सम्बन्धी नक्सा, अन्य संलग्न कागजात तथा सो स्थानको गुगल अर्थबाट लिइएको elevation समेतलाई अध्ययन गर्दा उक्त भवनको अधिकतम उचाई ०००.०० मिटर (AMSL) रहेको पाइएको । यस प्राधिकरणको पूर्व स्वीकृती बिना उक्त उचाईमा वृद्धि गर्ने कुनै पनि स्थायी संरचना निर्माण, पोल, टावर, एण्टेना तथा अन्य कुनै पनि उपकरण जडान समेत नगर्ने सर्तमा Country's adoption of ICAO ANNEX-14, अन्तर्गत Obstacle Limitation Surface (OLS) मा व्यवस्था भएको मापदण्ड बमोजिम निर्माण सहमति प्रदान गरिएको व्यहोरा निर्णयानुसार जानकारी गराइन्छ ।

ई. ....  
प्रमुख, सिभिल ईन्जिनियरिंग महाशाखा

बोधार्थ:

१. श्रीमान् ..... ज्यू, ..... ।

### 3.8.3 Tippani in Nepali

.....नागरिक उड्डयन .....

..... विमानस्थल नागरिक उड्डयन कार्यालय

....., .....

## टिप्पणी र आदेश

विषय: भवनको उचाई सम्बन्धमा ।

मिति: २०००/००/००

श्रीमान् महाशाखा प्रमुख ज्यू,

प्रस्तुत विषयमा नगरपालिका कार्यालयको च. नं. ०००, मिति २०००/००/०० को पत्र र सो साथ प्राप्त जग्गाको नापी नक्सा, साईट प्लान, भवन निर्माण नक्सा तथा अन्य कागजपत्र पेश गरी भवन निर्माणको लागि सहमति माग गरेको व्यहोरा अनुरोध छ । Contry's adoption of ICAO ANNEX-14 अन्तर्गत Obstacle Limitation Surface (OLS) मा भएका मापदण्ड बमोजिम निर्माण सहमति दिन प्राप्त कागजपत्र तथा गुगल अर्थबाट site को elevation तथा रनवे देखि सो स्थान सम्मको दुरि लिई निर्माण हुने संरचनाको अधिकतम उचाई निकालिएको Calculation Sheet यसै साथ संलग्न छ । सो अनुसार भवनको अधिकतम उचाई ०००.०० मिटर (AMSL) भएको पाइएको हुँदा न. पा. वडा नं. ००, कित्ता नं. ०, ००, ००० मा उक्त उचाईको भवन निर्माणले OLS मा बाधा नपर्ने हुँदा निर्माण सहमति दिन सकिने व्यहोरा निर्णयार्थ पेश गर्दछु ।

.....  
ई....., व. स.  
सिभिल इन्जिनियरिङ्ग महाशाखा

व. अ. ई. श्री .....जी,  
चेक जाँच गरी राख ।

.....  
ई. ....  
प्रमुख, सिभिल इन्जिनियरिङ्ग महाशाखा

श्रीमान् महाशाखा प्रमुख ज्यू,

उक्त पेश भई आएका Calculation Sheet, नक्सा तथा अन्य कागजपत्रहरु चेक जाँच गर्दा Contry's adoption of ICAO ANNEX-14 अनुसार OLS penetrate नगरेकोले सहमति दिन सकिने व्यहोरा पेश गर्दछु ।

.....  
ई. ...., व. अ.  
सिभिल इन्जिनियरिङ्ग महाशाखा

श्रीमान् महाप्रबन्धक ज्यू,

माथि पेश भए बमोजिमको व्होरा स्वीकृतार्थ पेश गर्दछु ।

.....  
ई. ....  
प्रमुख, सिभिल इन्जिनियरिङ्ग महाशाखा

### 3.8.4 Letter in English

Date:- 2080-02-02

To  
..... Municipality  
....., ..... Province  
Nepal

Subject: Regarding consent for building construction

In response to the letter received from that office dated 2080-02-01 with ref. no. 25 requesting consent for building construction, this is to certify that maximum permitted elevation of the proposed Tower located at Tango Municipality-11, Bravo having plot no. 123 of Mr. Alpha Yankee determined after studying the received drawings, Google Earth Map other related papers is 150.000 m (AMSL). Furthermore, it is to notify that this permit has been granted in accordance with the standards stipulated in Obstacle Limitation Surface (OLS) under Civil Aviation Requirement-14 (CAR-14) on the condition that there shall be no further increment of Tower height by permanent construction of structure or by installation of pole, tower, antenna or any other equipment without prior approval of this Authority.

.....  
Er.  
Cheif, CED

CC:  
1. GM, .....Airport

### 3.9 Steps to calculate Obstacle Height with Auot-Process

The following steps shall be followed to calculate Obstacle height

- 1) Prepare input in all the text files as in Figure 12
- 2) Open the application

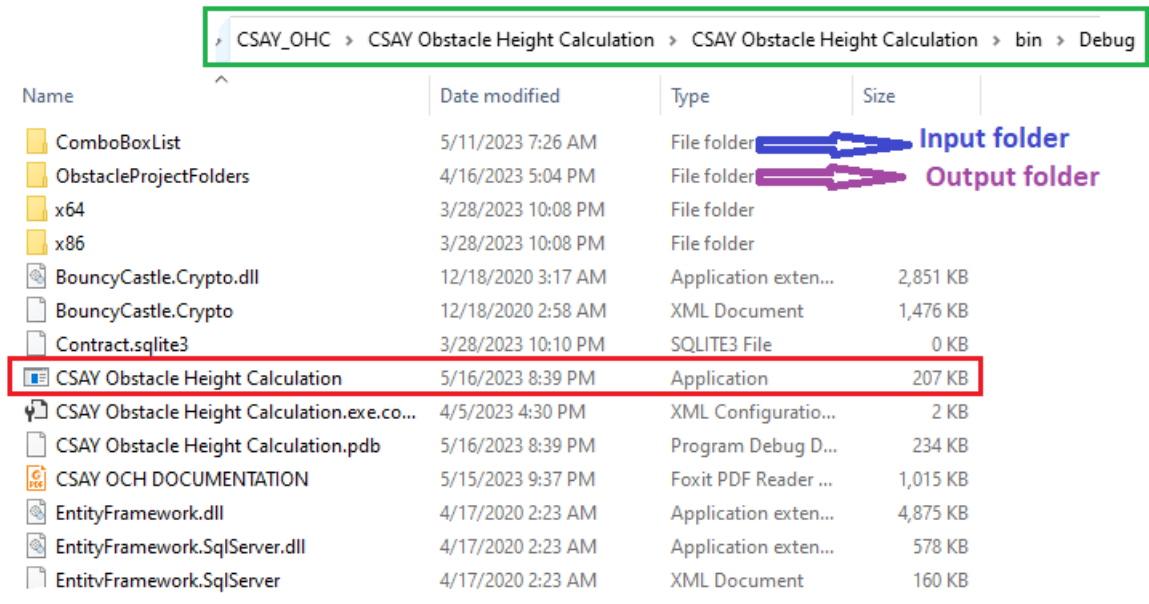


Figure 28. Software Executable file Location

- 3) The screen as in Figure 13 appears
- 4) Load RWY location data as in Figure 14
- 5) Navigate through different tabs and input all the fields labelled black in color as in Figure 15 to Figure 18.
- 6) Click “Auto process” as shown in Figure 24.
- 7) The output will be saved in “ObstacleProjectFolders” as shown in Figure 28.