

**The Perfect Solution for Road Construction works from Starting to end.**

## **Solutions**

- ◆ Horizontal alignment
- ◆ Profile Grade Levels
- ◆ Super elevation data's
- ◆ Road Cross Sections
- ◆ Work Limits & Cut fill Area
- ◆ Road Earthwork Quantities
- ◆ Road Pavements & Coat Quantities
- ◆ Earthwork Progress Quantities
- ◆ Survey Layout Levels - Embankment
- ◆ Survey Layout Levels - Pavements

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## **02. Introduction**

Roads play an important role in each country's developments and economical growth. Thus the demand for the requirements of roads, its maintenance and extension are increasing day by day.

The design factors of the new road data's is differ the each section of road. To start the new project, only the design documents are not enough to start construction, in fact many construction based documents are required for the project within the time limit, it is a big issue.

Road Solver is considered its minimize the construction difficulties and is offering solution and support from starting to end of each project activities. The major fact of road solver is design inputs used one time and that will support for construction from each stage of construction.



At the stage of Beginning the Road Solver give the centre line coordinates for Road alignment setting out. And also the Slope stake report to identify the cut Fill Areas and its limits of each chainage to start work.

The Road Cross Sections to support to find out the Quantities of Earthworks , Pavments to findout the project cost requirements.

At the Time of Earthworks the Surveyor required for each Embankment layer levels for setting out the layer. That will be done by Road Solver without any Templates. This report generated from XSections.

At the end of Project the Road Solver produces the as Built Quantities for final Submission. The Road Solver make the Road Full section in one sheet including Quantity Calculations.

At the time of Pavement Construction Road Solver to support the width limits of each layers. Also to Calculate the Quantities for BOQ and any other related requirements.

At the Time of Earthworks the partial Fill / Cut Quantity is in need for BOQ Purpose . This issue is more complicated and takes more time for completion. Road Solver give simple solution to this problem .

### 03. How Road Solver Support in Road Construction





## 04. Reason to choose Road Solver



### Cost Saver

1. Road Solver can be operate together with their routing job. So Road solver save the manpower.
2. Pavement Volume calculated 100% accuracy. So no wastage from site. So save money in material Cost.
3. The Setting out point of Pavement limits to fix the limit of construction. So reduce excess of works. So save money in equipment cost.



### User Friendly

1. Any one can operate.
2. Easy to understand.
3. Direct inputs from Design.
4. One time input the design data.
5. Template will be created by graphics method So easy to understand the points positions.
6. Reports are generated by PDF formats. So easy to manage the records.



### Time Saver

Road Solver Generate the Reports on the basis of one time input data's. Once created the all Required data's , by the click only get the Output Reports. Especially the earthwork Progress volume Qty generate within the minutes of 1km span. Road solver definitely is a Time saver.



### Reduce Work Load

Road Solver is designed to understand the technic and functions to operate the all levels of Construction management team. So any one can handle with any task with Quickly and simply. Road Solver is Reduce workload without any tension.



### Multi Tasking

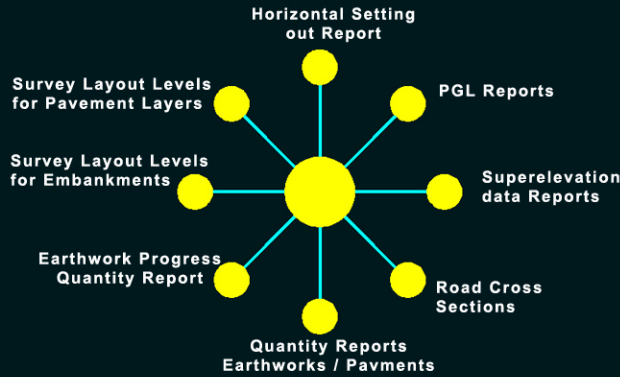
Road Solver is simple and easy to generate all required construction Reports in one Software. Road alignment, Cross Sections , Quantities , Layout Setting Levels and Progress Quantities all is done by one Software. Road solver is multi tasking facility software.



### Direct Design Input

Road Solver accept for input data from Design by direct without any modifications. Left and Right Carriageway slope variations, change of Road widths will apply directly from Road designs.

At the each stage of Road Construction works need Documents from Design Data. For this case Road Solver will support for each stage of work documents.



**All Reports in One Software**

**1**

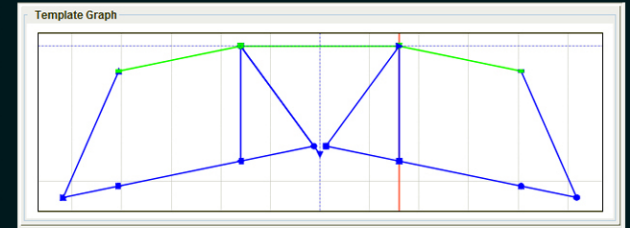
The Road Solver Software is programmed by the inter link method for all the calculations. So the Design data will be input only one time.



**One time input only**

**2**

In Road Solver the templates are created by graphical method. So easy to understand and manage the complicated typical by simply.



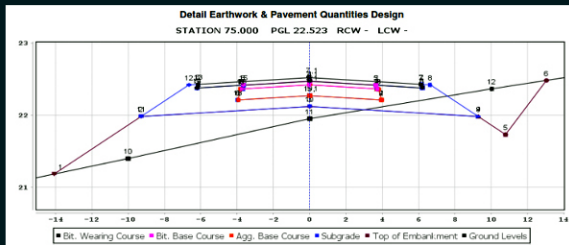
**Template Created by graphically**

**3**

## 05. Benefits of Road Solver

**4**

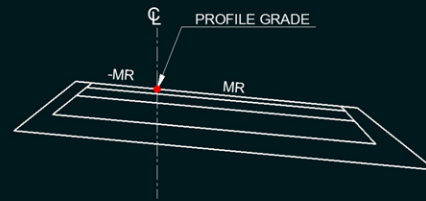
**Road Full Section in one graph**



In Road Solver view the Full Section of Road. From this we can easily find out mis matching sections of Earthwork and Pavements.

**5**

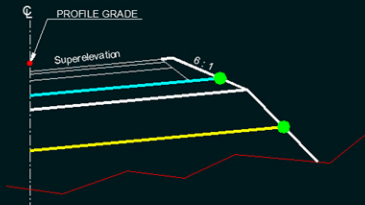
**Reverse Slope in Single Carriageway to be resolved**



In Any Typical Section the PGL will be in middle of Road the Reverse slope of Carriage way will be resolved in Road Solver Software.

**6**

**Catch Points in Slope to be resolved**



The Catch points will be resolved in Pavement and Earthwork Templates. This will support for construction 100% accuracy of work.

## ***06. Why Road Solver is so Important?***

**Road Solver  
Support for  
Construction  
activities from  
start to end of  
Project.**

**To get the  
Reports for  
entire project by  
the input of one  
time data.**

**The Reports are  
designed based  
on construction  
Requirement. So  
Directly apply on  
work site.**

# 07. Method of Calculation

## Area Calculation Method

### Area by Co-Ordinates :

**Area ( Irregular Shape )**

Area =

$$\sum \frac{\{(E_1+E_2)\times(D_1-D_2)\}}{2} + \frac{\{(E_2+E_3)\times(D_2-D_3)\}}{2} + \dots + \frac{\{(E_{n-1}+E_n)\times(D_{n-1}-D_n)\}}{2}$$

### Area by Trapezoidal Method:

O1 O2 O3 O4 O5

$d$  O1, O2..., On = Ordinate at equal intervals  
 $d$  = common distance

1st Area =  $\frac{O1+O2}{2} \times d$       3rd Area =  $\frac{O3+O4}{2} \times d$

2nd Area =  $\frac{O2+O3}{2} \times d$       Last Area =  $\frac{O4+O5}{2} \times d$

Total Area =  $\frac{d}{2} (O1+2O2+2O3+\dots+2O_{n-1}+O_n)$

FORMULA =  $\frac{\text{Common distance}}{2} \left[ \frac{\text{1st ordinate} + \text{last ordinate} + 2(\text{sum of other ordinate})}{2} \right]$

## Volume Calculation Method

### Average Area Method :

**Average Area Method**

Station	Area ( Sq.m )		Dist (m)	Ave. Area (Sq.m)		Volume ( Cum )	
	Fill	Cut		Fill	Cut	Fill	Cut
0+000	4.527	-					
0+025	2.857	2.151	25.00	3.892	1.076	92.300	28.888
0+050	1.500	2.441	25.00	2.179	2.296	54.463	57.400
0+075	3.257	0.542	25.00	2.379	1.492	59.463	37.288
0+100	-	3.859	25.00	1.829	2.101	40.713	52.513
Grand Total						246.938	174.088

### Zeropoint Method (KSA):

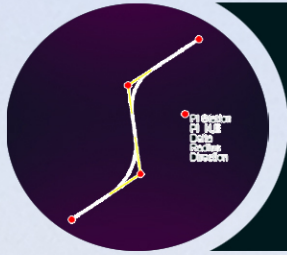
Distance of Fill  $D_F = \frac{A_F \times L}{A_F + A_C}$

Distance of Cut  $D_C = \frac{A_C \times L}{A_F + A_C}$

**Average Area Method**

Station	Area ( Sq.m )		Dist (m)	Ave Area (Sq.m)		Volume ( Cum )	
	Fill	Cut		Fill	Cut	Fill	Cut
0+000	2.049	-					
0+025	1.500	-	25.00	2.542	-	27.113	-
0+050	2.478	-					
0+025	-	2.441	12.406	1.221	-	15.604	-
Grand Total						42.717	15.141

## 08. Solutions from Road Solver

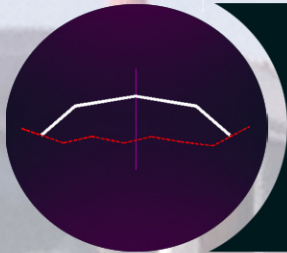


### 01. Horizontal Settingout Reports

In this option using PI station Inputs without CAD Support Road Solver give the Reports of Centre line Co ordinates and Offset Coordinates based on required interval. The Excel format option also available.

### 02. Road Cross Section Reports

Successfull inputs of NGL , PGL , Slope and Templates the Road Levels calculated and store in Database. From that Database the Road Cross Sections are Created by PDF reports including Earthworks and Pavements together with Volumes.



### 03. Slope Stake Report

From the Road Sections Slope Stake Report will be generated . In this Report to identify by the Cut / Fill Areas and Distance from centre line of Each Cut and Fill slope. This Report more usefull for initial stage of Project.

### 04. Road Earthwork Quantities

After Successfull Completion of Earthwork Template Calculation , Road Solver generated the Earthwork Quantities Report including Sections and Calculations of Quantities based on the method of Average Area and Zero point volume methods.



Fill : 2573.257  
Cut : 1575.657



### 05. Earthwork Progress Quantities

At the time of Earthwork Construction for the BOQ for partial filling area quantity calculation is more difficult and complicated. Road Solver simply solve this problem by inserting the Progress Levels inside the Road Section to calculate the Quantity Easily.

### 06. Road Pavement Quantities

Using the Help of Pavement Template to calculated the Pavements Volume Quantities. The Report will be generated separately or by selection and together with earthworks is possible in Road Solver.



BWC : 453.574  
BBC : 157.357  
SG : 457.541

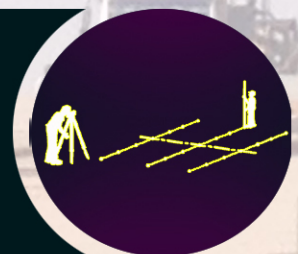


### 07. Embankment Layer Layout Levels

At the time of Earthwork Construction the Filling will be laid by multiple layers. Each Layer need stakeout levels for Surveyor to layout the layer in the field. Road Solver support this process to get the level sheets for each layer of embankment with required stake distance.

### 08. Survey Layout Levels - forPavement Layer

In Pavement Layer Construction the Stakeout is more important of Road. Because of smoothness of depends based on the pavement layer construction. Road Solver simply create the level sheets with the help of Pavement layer Templates.



### 09. Profile Levels

Road Solver support to calculate the PGL data from the PVI data's. The Report will be generated in PDF and Excel file formats.

### 10. Super elevation data's

From this option to calculate the Slope data as per the inputs of RCW and LCW slopes. The output will be in PDF and Excel formats for any other purposes.



# 09. Road Solver Work Flow Diagram

**IMPORT / EXPORT  
FOR PROJECT / ROADS**

**INPUTS**

**SUPPORT FOR CALCULATION**



**HORIZONTAL ALIGNMENT  
PI STATION & OTHER DETAILS**

**NATURAL GROUND LEVELS**

**VERTICAL ALIGNMENT  
PVI STATION & OTHER DETAILS**

**SLOPE DATA'S  
RIGHT & LEFT CARRIAGE SLOPES**

**VARIABLES\***  
(FOR VARIABLE LENGTH AND OTHERS )  
\*OPTIONAL

**EARTHWORK TEMPLATES**  
IMPORT / EXPORT OPTION AVAILABLE

**PAVEMENT VOLUME  
TEMPLATES**  
IMPORT / EXPORT OPTION AVAILABLE

**PAVEMENT LAYER  
TEMPLATES**  
IMPORT / EXPORT OPTION AVAILABLE

## REPORTS FOR CONSTRUCTION

**HORIZONTAL SETTINGOUT REPORT FOR ROAD ALIGNMENT** 01

**EARTHWORK CROSS SECTIONS INCLUDING QUANTITY CALCULATIONS** 02

**SLOPE STAKE REPORT INCLUDING CUT FILL AREA IDENTIFICATION.** 03

**EMBANKMENT LAYER LAYOUT LEVEL SHEET FOR SURVEYORS TO WORK FOR EMBK LAYERS** 04

**EARTHWORK PROGRESS QUANTITY REPORT FOR BOQ IN PARTIAL FILL AREAS** 05

**PROFILE GRADE LEVELS FOR ANY INTERVAL TO GET REPORT IN PDF OR EXCEL FOR ADD. PURPOSE** 06

**PAVEMENT CROSS SECTION FOR QUANTITY AND CONSTRUCTION PURPOSE** 07

**PAVEMENT LAYER LAYOUT LEVEL SHEET FOR SURVEYORS TO WORK FOR PAVEMENT LAYERS** 08

**SUPERELEVATION DATA'S TO BE CALCULATED AS PER CONSTRUCTION REQUIREMENT** 09

### INPUTS

**EMBANKMENT  
PROGRESS LEVELS  
IMPORT**

# 10. Horizontal Alignment Solutions

Horizontal Alignment

PI Station  Radius

PI Northing  Direction

PI Easting  Spiral Length

Delta

**Input Window**

S.N	PI Station	PI Northing	PI Easting	Delta	Radius	Dir	Spiral ...
1	0	2545719.3979	341964.0368	d0m0s0	0	0	0
2	2969.618	2548591.2706	342719.6663	d61m3s35.91	1500	Right	0
3	7754.99	2549806.934	347524.3363	d107m16s26.17	1800	Left	0
4	10579.16	2553511.5266	345256.5811	d72m17s9.36	900	Right	200
5	14651.391	2556731.1737	348036.9979	d64m44s4.75	2300	Right	0
6	20190.139	2555161.5958	353678.4234	d67m2s58.54	1500	Left	150
7	25459.489	2559467.8738	357103.5747	d0m0s0	0	0	0

## Introduction :

Road Solver to make the Horizontal Alignment Solutions with using CAD. In this option to input of PI Station values to get the Co ordinate Report of required station intervals with offsets of Left and Right.

## Input Values :

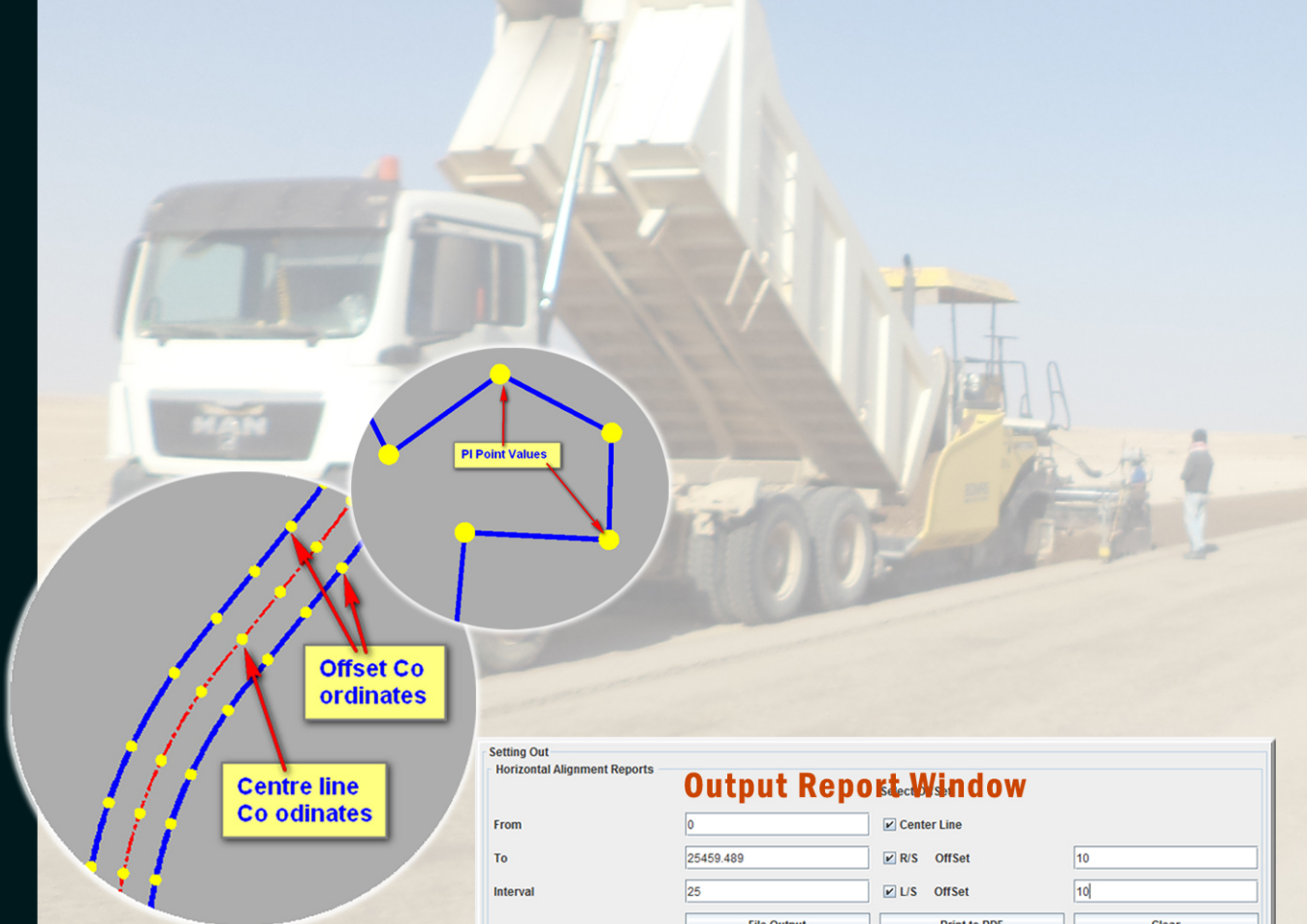
1. PI Station
2. PI Station Northing & Easting
3. Delta
4. Radius
5. Direction of Curve
6. Spiral Length

## Output Reports :

1. Detailed Report of Curve data's.
2. Road Cente line alignment Co ordi nates based on required intervals.
3. Road Right & Left alignment Co ordi nates by the offset value based on required intervals.
4. All Reports in Excel file format.

## Features :

1. Unlimited Input Facility.
2. Simplified User entry option.
3. Circular , Spiral Curve Solutions.
4. Straight Line Calculation option.
5. Required Interval Input Facility.
6. Pdf Report Generation option.
7. Input data Import/Export option.
8. Excel File output facility for Report further Modifications.



Setting Out  
Horizontal Alignment Reports

**Output Report Window**

From   Center Line

To   R/S Offset

Interval   L/S Offset

# 11. Road Earthwork Quantities Report

## Introduction :

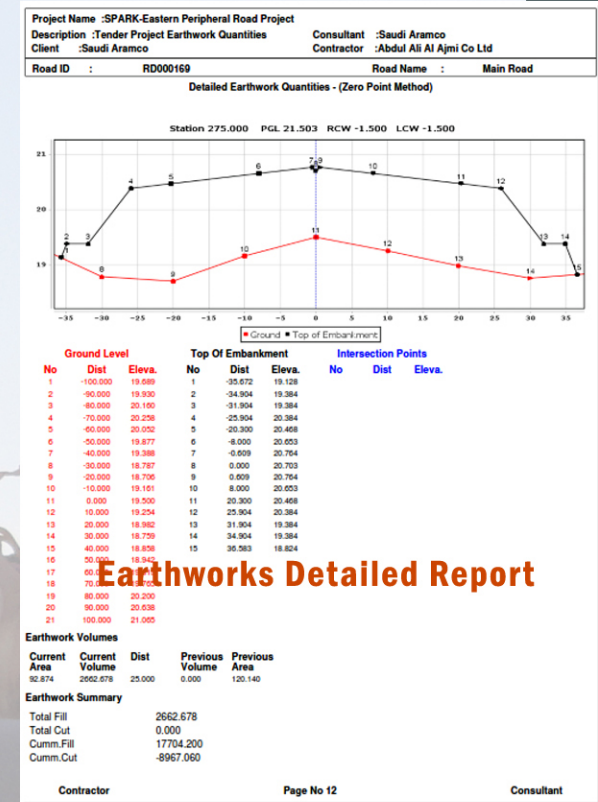
Road Earthwork Sections will be created in Road Solver with the help of Templates. The Template of Earthwork to calculated the Road Levels based on PGL , Slope and Natural Ground Levels. Also the Side Slope values are calculated by the inputs of side slope data's. The Successfully completed the road levels the Quantities are calculated as per the selection of calculation methods.

## Method of Calculation:

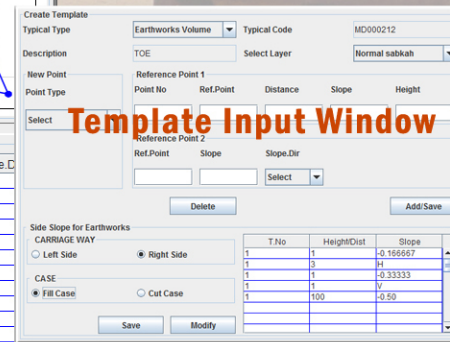
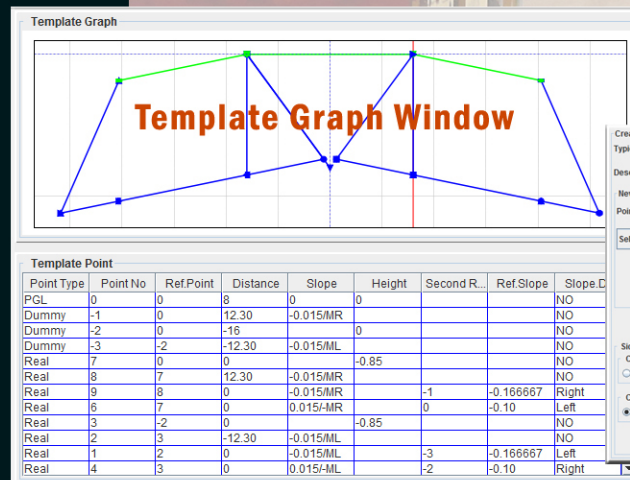
1. Insert the NGL first
2. Create PVI data's
3. Create the Superelevation data's
4. Create Typical Model
5. Create Template for Earthworks
6. Insert the Side Slope Data's
7. Goto PVI Table - Calculate the PGL for required NGL Station.
8. Run the Template to store the Road Levels in TOE database.
9. Now ready to Print the Earthwork Quantities Reports from Report Menu.

## Facilities :

1. Volume Calculation method Selection (average area , Trapezoidal and Zeropoint)
2. Detailed Report ( Full Report )
3. Summary Report
4. Total Report



Earthworks Detailed Report



Template Input Window

# 12. Road Slope stake & Cut/Fill Report

Project Name : SPARK-Eastern Peripheral Road Project		Consultant : Saudi Aramco	
Description : Tender Project Earthwork Quantities		Contractor : Abdul Ali Al Ajmi Co Ltd	
Client : Saudi Aramco		Contractor : Abdul Ali Al Ajmi Co Ltd	
Road ID :	RD000169	Road Name :	Main Road

SLOPE STAKE REPORT				
STATION	LEFT SIDE		RIGHT SIDE	
	DIST	CASE	DIST	CASE
0	36.807	Cut	41.306	Cut
25	37.137	Cut	41.499	Cut
50	39.227	Cut	40.001	Cut
75	29.274	Fill	39.405	Cut
100	33.669	Cut	32.242	Cut
125	35.579	Fill	28.717	Fill
150	35.868	Fill	35.315	Fill
175	35.879	Fill	35.801	Fill
200	35.879	Fill	35.801	Fill
225	36.616	Fill	27.32	Fill
250	37.904	Fill	31.101	Fill
275	35.672	Fill	36.583	Fill
300	35.233	Fill	36.904	Fill
325	35.745	Fill	28.632	Fill
350	31.54	Fill	31.278	Cut
375	28.448	Cut	31.429	Cut
400	30.463	Cut	27.489	Fill
425	31.19	Cut	34.117	Cut
450	31.753	Cut	35.417	Fill
475	28.279	Fill	31.539	Fill
500	31.742	Fill	31.324	Fill
525	37.32	Fill	30.703	Fill
550	37.904	Fill	31.1	Fill
575	39.344	Fill	30.015	Fill
600	39.919	Fill	37.118	Cut
625	40.657	Fill	37.979	Cut
650	40.590	Fill	35.327	Cut
675	40.472	Fill	28.286	Cut
700	38.109	Fill	37.766	Fill
725	37.904	Fill	37.905	Fill
750	37.904	Fill	39.004	Fill

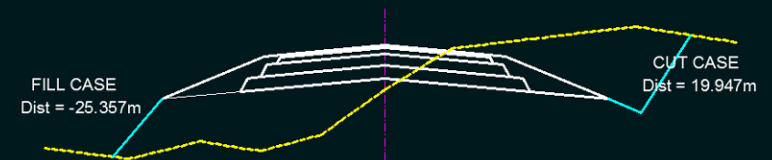
Slope Stake Report

Contractor Page No 1 of 7 Consultant

## Introduction :

At the Beginning of Project the earthwork is the first step of Construction. In that case we need to identify the Cut and fill areas and also need to find out the construction limit of work. So we need to take the data from each cross section to get this details. The process of this work will be long due to check each station. Road Solver solve this problem to give the clear report for each station fill or cut case and also give the distance from centre line of work limit. This data will be generated from Top of Embankment Levels which is already calculated.

## Diagram





# 14. Road Pavement Coat Quantities Reports

## Introduction :

Road Pavement Coat Quantities of Prime Coat or Tack Coat will be calculated in this option. The Data will be taken from already calculated pavement volume layers database. This Quantity will be measured as Square Meter units. This Pavement Coat Quantity calculation also possible to add the tolerance quantities of any item. This calculation will be made from existing pavement volume database only , so no need any inputs or any calculations.

## Method of Calculation:

1. Before calculate this Quantities the Pavement volume levels should be calculated.
2. The Report will be generated diretly from existing data's.

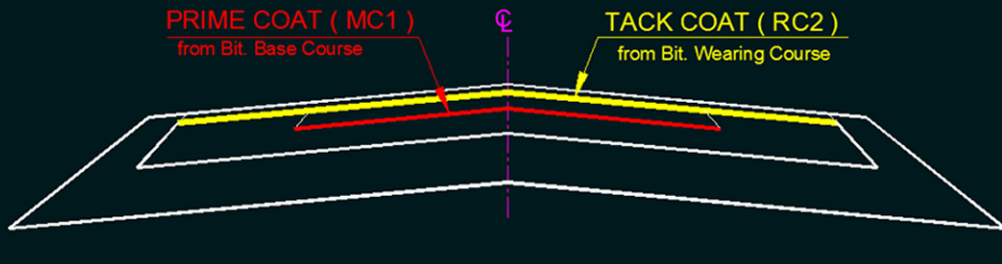
## Facilities :

1. This Quantity Report will be generated directly from existing data's no need any calculations.
2. The additional Tolerance width to be added as per user requirements.
3. This Quantity not only the asphalt the other any layer area quantities ( Subgrade Preparation ) will be calculated as per your inputs.

Project Name :Road Solver Sample Projects - Earthwork Pavement Quantities									
Description :Earthwork Pavement Qty					Consultant :XYZ Consultant				
Client :Ministry of Transport					Contractor :ABC Contractor				
Road ID	RD000115				Road Name				New Road Earthwork and Pavement Quantities
Pavement Coat Quantities-Bit. Base Course									
Prime Coat ( MC1 )									
Station	Dist	Mini.L	Max.L	Add.Length	Total Length	Avg.Length	Total Area	Cumm Area	
1300.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	4815.000	
1325.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	5007.600	
1350.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	5200.200	
1375.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	5392.800	
1400.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	5585.400	
1425.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	5778.000	
1450.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	5970.600	
1475.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	6163.200	
1500.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	6355.800	
1525.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	6548.400	
1550.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	6741.000	
1575.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	6933.600	
1600.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	7126.200	
1625.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	7318.800	
1650.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	7511.400	
1675.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	7704.000	
1700.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	7896.600	
1725.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	8089.200	
1750.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	8281.800	
1775.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	8474.400	
1800.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	8667.000	
1825.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	8859.600	
1850.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	9052.200	
1875.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	9244.800	
1900.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	9437.400	

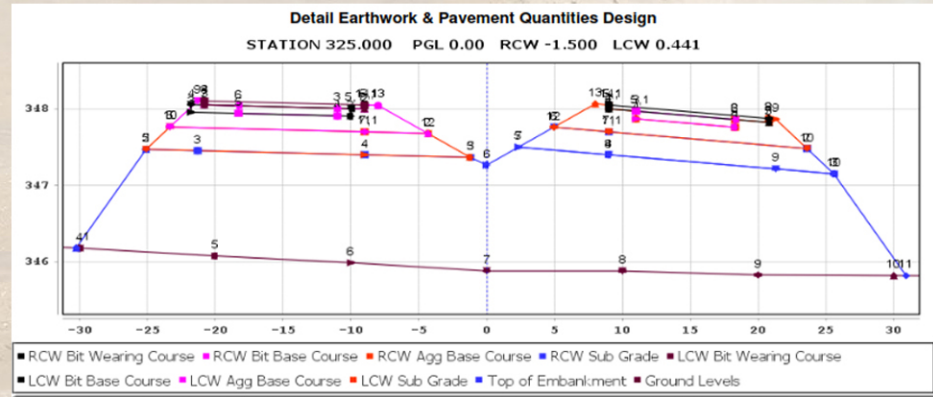
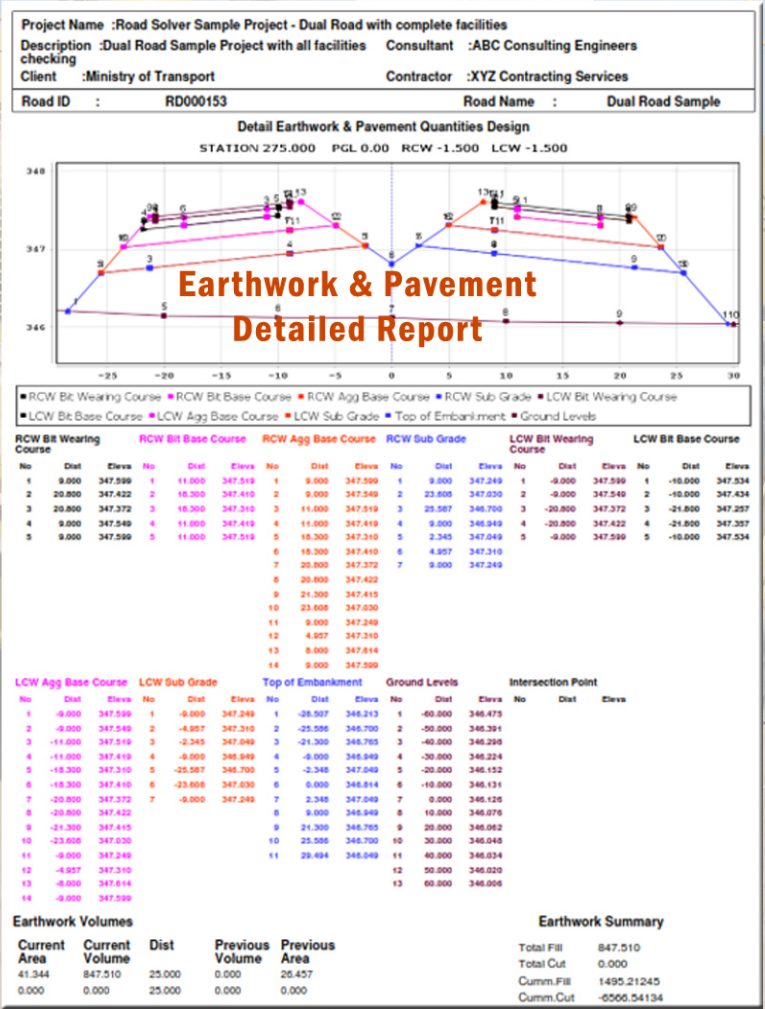
## Pavement Coat Quantities Report

Contractor Page No 2 of 3 Consultant



# 15. Road Cross Sections Report

Road Solver to generate the Road Cross Sections with Embankment and Pavements in one Diagram. This will help for construction in Super elevation and Transition Areas. Also the Reports are created in PDF format easy to use.

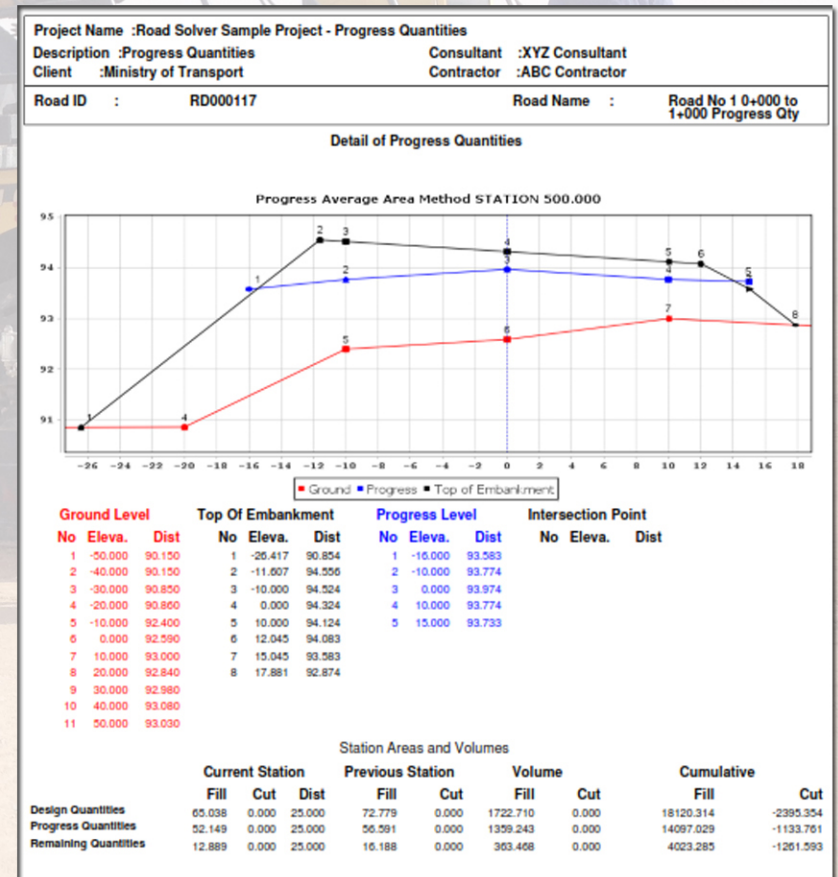
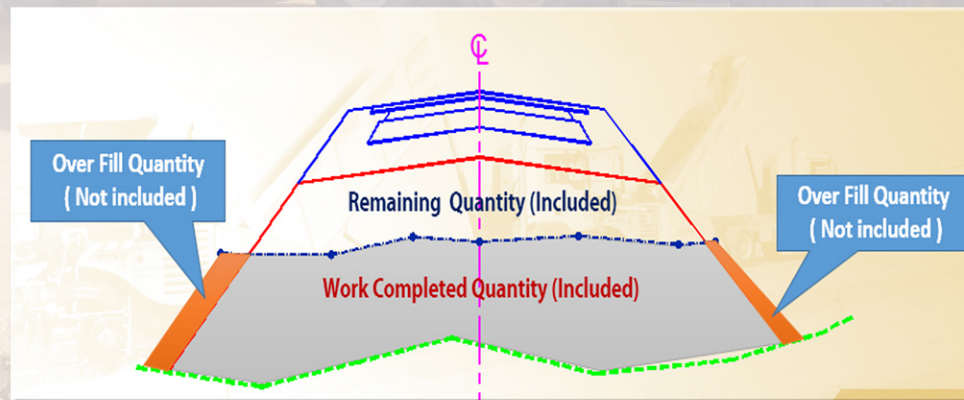


# 16. Earthwork Progress Quantities Report

## Why Progress Quantities are important..?

- ❖ At the Time of Earthworks the Progress Quantities is very important for BOQ..
- ❖ The Progress Survey Points are not measured exactly as per Design limits. So the intersecting point is calculated by manual process or by CAD support.
- ❖ To calculate the quantity the progress line comparing with design limits. So its difficult for calculation process.
- ❖ Also in BOQ additional fill or cut is not permitted for calculation.

Road Solver Solve this problem simply and Fastly..



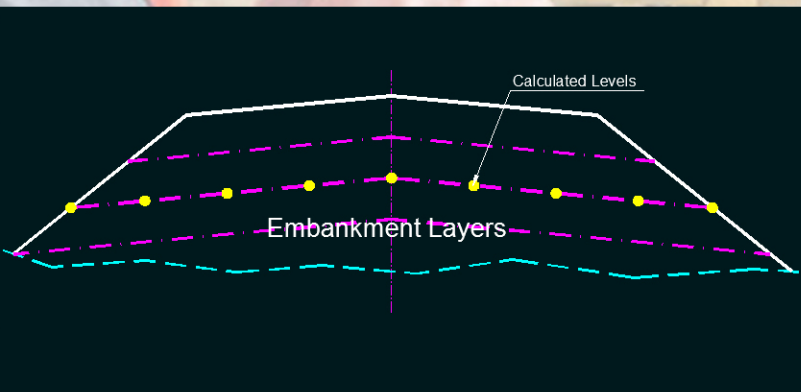
# 17. Survey Layout Levels - For Embankment Layers

## Why need need this..?

- ❖ Embankments are Filled by Layer by Layer.
- ❖ Each Layer different width due to side slope factor.
- ❖ Levels are vary in Super elevation areas.
- ❖ So Level sheets are so important for surveyors for check the layer and inspection process.

## What is the Benefits for this Reports..?

- To fix the exact location of filling limit.
- Reduce the material wastage.
- Easily to calculate the slope points in any condition.
- The Report direct from Road Cross Sections. No additional templates.
- Reduce the work load.



**This Report are generated from the existing TOE Levels without using Templates.**

Project Name :Road Solver Sample Project - Pavement and Embankment Levels											
Description :Pave and Embank Levels						Consultant :XYZ Consultant					
Client :Ministry of Transport						Contractor :ABC Contractor					
Road ID :	RD000118					Road Name :	Road No 1 Pave and Embk Levels				
Embankment Layer Report											
6th Layer Embankment											
Height From TOE :0.90 Interval of :2.50											
Station No	1	2	3	4	5	6	7	8	9	10	
Dist	-13.444	-12.500	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	
Elev.	93.073	93.087	93.124	93.161	93.199	93.236	93.274	93.236	93.199	93.161	
No	11	12	13								
Dist	10.000	12.500	13.444								
Elev.	93.124	93.087	93.073								
Station No	1	2	3	4	5	6	7	8	9	10	
Dist	-13.444	-12.500	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	
Elev.	92.872	92.886	92.923	92.960	92.998	93.035	93.073	93.035	92.998	92.960	
No	11	12	13								
Dist	10.000	12.500	13.444								
Elev.	92.923	92.886	92.872								
Station No	1	2	3	4	5	6	7	8	9	10	
Dist	-13.450	-12.500	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	
Elev.	92.632	92.646	92.684	92.722	92.760	92.797	92.834	92.797	92.760	92.722	
No	11	12	13								
Dist	10.000	12.500	13.449								
Elev.	92.684	92.646	92.632								
Station No	1	2	3	4	5	6	7	8	9	10	
Dist	-13.444	-12.500	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	
Elev.	92.358	92.372	92.409	92.446	92.484	92.521	92.559	92.521	92.484	92.446	
No	11	12	13								
Dist	10.000	12.500	13.444								
Elev.	92.409	92.372	92.358								
Station No	1	2	3	4	5	6	7	8	9	10	
Dist	-13.449	-12.500	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	
Elev.	92.043	92.057	92.095	92.133	92.171	92.208	92.245	92.208	92.171	92.133	
No	11	12	13								
Dist	10.000	12.500	13.450								
Elev.	92.095	92.057	92.043								
Station No	1	2	3	4	5	6	7	8	9	10	
Dist	-13.444	-12.500	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	
Elev.	91.694	91.708	91.745	91.782	91.820	91.857	91.895	91.857	91.820	91.782	
No	11	12	13								
Dist	10.000	12.500	13.444								
Elev.	91.745	91.708	91.694								
Station No	1	2	3	4	5	6	7	8	9	10	
Dist	-13.444	-12.500	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	
Elev.	91.306	91.320	91.357	91.394	91.432	91.469	91.507	91.469	91.432	-CUT-	
No											
Dist											
Elev.											

**Embankment Layer - Level Sheet**

# 18. Survey Layout Levels - For Pavement layers

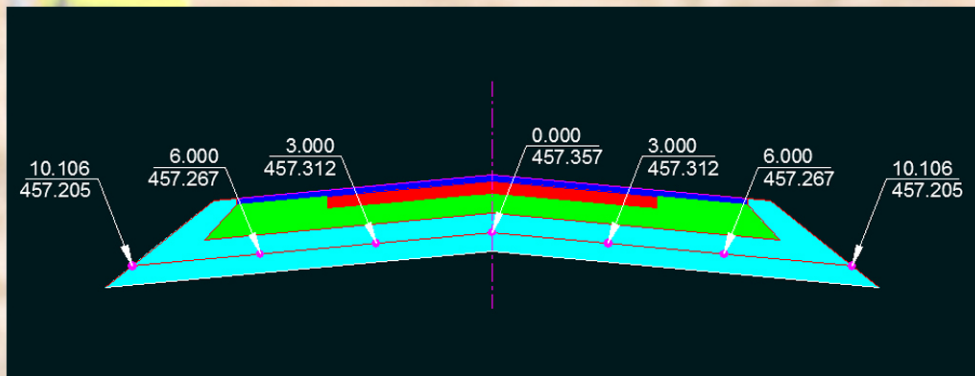
## Why Pavement Layout Level are more important ?

- ❖ Pavements are the major structure of Roads.
- ❖ Pavement Materials are more costlier than others.
- ❖ Any wastage of materials will affect the project cost.
- ❖ The Surface Smoothness is based on pavement structure Profile.
- ❖ Super elevation and Catch points is need more accurate .

Pavement Structure & its Levels to play major role in Road Construction. So Layout levels are more important than others.



## How it Works..?



Project Name :Road Solver Sample Project - Pavement and Embankment Levels										
Description :Pave and Embank Levels						Consultant :XYZ Consultant				
Client :Ministry of Transport						Contractor :ABC Contractor				
Road ID :	RD000118					Road Name :	Road No 1 Pave and Embk Levels			
Pavement Layer Report										
Subgrade 1 Layer										
Station No	1	2	3	4	5	6	7	8	9	10
87.5 Dist	-11.978	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	10.000
Elev.	95.546	95.576	95.613	95.651	95.688	95.726	95.688	95.651	95.613	95.576
No	11									
Dist	11.978									
Elev.	95.546									
Station No	1	2	3	4	5	6	7	8	9	10
100 Dist	-11.978	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	10.000
Elev.	95.508	95.538	95.575	95.613	95.650	95.688	95.650	95.613	95.575	95.538
No	11									
Dist	11.978									
Elev.	95.508									
Station No	1	2	3	4	5	6	7	8	9	10
112.5 Dist	-11.978	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	10.000
Elev.	95.470	95.500	95.537	95.575	95.612	95.650	95.612	95.575	95.537	95.500
No	11									
Dist	11.978									
Elev.	95.470									
Station No	1	2	3	4	5	6	7	8	9	10
125 Dist	-11.978	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	10.000
Elev.	95.432	95.462	95.499	95.537	95.574	95.612	95.574	95.537	95.499	95.462
No	11									
Dist	11.978									
Elev.	95.432									
Station No	1	2	3	4	5	6	7	8	9	10
137.5 Dist	-11.978	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	10.000
Elev.	95.395	95.425	95.462	95.500	95.537	95.575	95.537	95.500	95.462	95.425
No	11									
Dist	11.978									
Elev.	95.395									
Station No	1	2	3	4	5	6	7	8	9	10
150 Dist	-11.978	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	10.000
Elev.	95.357	95.387	95.424	95.462	95.499	95.537	95.499	95.462	95.424	95.387
No	11									
Dist	11.978									
Elev.	95.357									
Station No	1	2	3	4	5	6	7	8	9	10
162.5 Dist	-11.978	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	10.000
Elev.	95.319	95.349	95.386	95.424	95.461	95.499	95.461	95.424	95.386	95.349
No	11									
Dist	11.978									
Elev.	95.319									

## Pavement Layer - Level Sheet

# 19. Profile Grade Levels ( PGL )

## Introduction :

Profile Grade Levels are the one of the major part of Geometric data in Road Construction Design. Using this option to calculate the Road Profile Grade Levels (PGL) by the required station intervals by Serial and Random outputs. The Report will be generated by Pdf and Excel file output formats. In Addition the PVI's datas are used in Road Template calculations like TOE Level Calculation and Pavement Volume , Pavement Level Calculation options.

## Inputs :

1. PVI Station
2. PVI Elevation
3. Length of Vertical Curve ( LVC )

## Direct Outputs :

1. PGL - By Serial or Random
2. PGL Report by PDF
3. PGL Report by Excel

## InDirect Outputs :

PGL Data's are indiretly taken from inside the database for the following functions..,

1. Earthwork Template Calculation
2. Pavement Volume Template Calculation.
3. Survey Layout Levels - Pavement Layer Template Calculations.

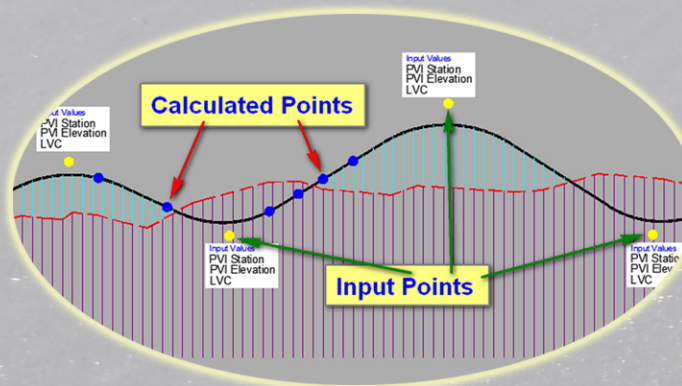


Project Name :Road Solver Sample Projects - Vertical Alignments  
Description :Vertical Alignment Consultant :XYZ Consultant  
Client :Ministry of Transport Contractor :ABC Contractor  
Road ID : RD000112 Road Name : Road No 1 - Vertical Alignments Model 1

Vertical Alignment Report  
Profile Grade Level

Station	Elevation
0	100.357
25.000	100.400
50.000	100.442
75.000	100.485
100.000	100.527
125.000	100.570
150.000	100.612
175.000	100.655
200.000	100.697
225.000	100.740
250.000	100.783
275.000	100.825
300.000	100.868
325.000	100.910
350.000	100.953
375.000	100.995
400.000	101.038

PGL Report - PDF



Profile Grade Level

Station	Elevation
0	100.3570
25	100.4000
50	100.4421
75	100.4847
100	100.5272
125	100.5698
150	100.6123
175	100.6549
200	100.6974
225	100.7400
250	100.7826
275	100.8251
300	100.8677
325	100.9102

PGL Report - Excel

# 20. Super Elevation Data's

Project Name :Road Solver Sample Projects - Super Elevation data  
 Description :Superelevation data  
 Client :Ministry of Transport  
 Consultant :XYZ Consultant  
 Contractor :ABC Contractor  
 Road ID : RD000114  
 Road Name : Road No 1 - Superelevation data Model

Super Elevation Data's  
 MCW Right

**Slope Report - PDF**

Station	Slope (%)
0.000	-1.500
25.000	-1.500
50.000	-1.500
75.000	-1.500
100.000	-1.500
125.000	-1.500
150.000	-1.500
175.000	-1.500
200.000	-1.500
225.000	-1.500
250.000	-1.500
275.000	-1.500

Road No 1 - Superelevation data Model

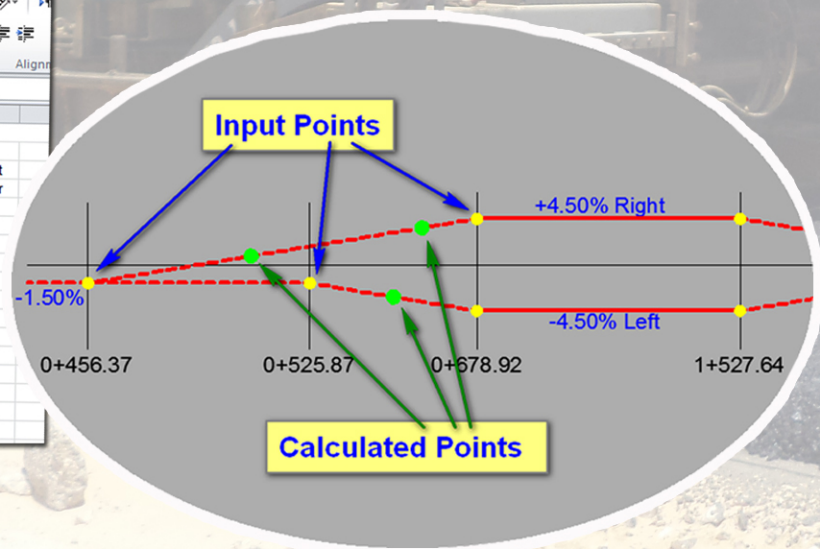
File Home Insert Page Layout Formulas Data Review View

Clipboard Font

C6

Station	Slope (%)
0	-1.500
25	-1.500
50	-1.500
75	-1.500
100	-1.500
125	-1.500
150	-1.500
175	-1.500
200	-1.500
225	-1.500
250	-1.500
275	-1.500

**Slope Report - Excel**



## Introduction :

Superelevation data's used in Road Solver program to calculate the Road cross slope values with required station intervals and using the variables in template to calculate the required unknwn points. In Road Solver software the Superelevation has used as a six variables as Main Carriage Way Right , Main Carriage Way Left , Inner Shoulder Right , Inner Shoulder Left , Outer Shoulder Right and Outer Shoulder Left.

## Inputs :

1. Slope varies Station
2. Slope Varies Value in %

## Type of Variables :

1. MR - Main Carriageway Right
2. ML - Main Carriageway Left
3. IR - Inner Shoulder Right
4. IL - Inner Shoulder Left
5. OR - Outer Shoulder Right
6. OL - Outer Shoulder Left

## Used Locations :

1. Earthwork Templates
2. Pavement Volume Templates
3. Pavement Layer Templates

# 21. ROAD SOLVER REPORT MODELS

## Horizontal Alignment Reports - Curve Details

Horizontal Alignment Report Station and Curves			
Start Station:	Sta: 2000	N: 2575398.6446	E: 365509.6905
Curve No : 1 Type : Circular Curve	PI Sta: 3694.831 PC Sta: 2492.159 PT Sta: 4734.099 Delta: 51-22-53 Tangent: 1202.672	N: 2573707.9454 N: 2574907.6858 N: 2572893.5733 Direction: Right Curve Length: 2241.940	E: 365627.9669 E: 365544.0365 E: 364742.9704 Radius: 2500.000 Exit.Dist: 274.242
Curve No : 2 Type : Circular Curve	PI Sta: 6072.111 PC Sta: 4930.600 PT Sta: 7005.153 Delta: 59-25-54 Tangent: 1141.511	N: 2571987.5593 N: 2572760.5154 N: 2570871.2081 Direction: Left Curve Length: 2074.553	E: 363758.3845 E: 364598.3733 E: 363996.7276 Radius: 2000.000 Exit.Dist: 302.835
Curve No : 3 Type : Circular Curve	PI Sta: 8781.273	N: 2569134.2361	E: 364367.5743
Curve No : 4 Type : Spiral Curve	PI Sta: 11069.037 BTC Sta: 10524.645 BCC Sta: 10724.645 ECC Sta: 11341.958 ETC Sta: 11541.958	N: 2567678.0638 N: 2568024.5719 N: 2567903.4905 N: 2567778.0825 N: 2567824.1176	E: 362603.0840 E: 363022.9589 E: 362863.9307 E: 362273.1530 E: 362078.6500
	Circular Curve Data Delta: 55-5-39 Tangent: 544.392	Direction: Right Curve Length: 617.313	Radius: 850.000 Exit.Dist: 108.935
	Spiral Curve Data Spiral Length: 200.000 Radius: 850.000 Theta: 6-44-27	XM: 99.951 TK: 66.753 TL: 133.432	X: 199.723 Y: 7.835 A: 412.311
Curve No : 5 Type : Circular Curve	PI Sta: 13850.655	N: 2568443.4817	E: 359854.7061
Curve No : 6 Type : Spiral Curve	PI Sta: 16330.778 BTC Sta: 15823.370 BCC Sta: 15973.370 ECC Sta: 16534.530 ETC Sta: 16684.530	N: 2570900.4169 N: 2570397.7529 N: 2570547.0373 N: 2570993.9121 N: 2571043.2168	E: 360193.0545 E: 360123.8318 E: 360136.8314 E: 359847.6607 E: 359706.1550
	Circular Curve Data Delta: 81-29-43 Tangent: 507.408	Direction: Left Curve Length: 561.161	Radius: 500.000 Exit.Dist: 160.586
	Spiral Curve Data Spiral Length: 150.000 Radius: 500.000 Theta: 8-35-41	XM: 74.941 TK: 50.106 TL: 100.119	X: 149.662 Y: 7.488 A: 273.861
Curve No : 7 Type : Circular Curve	PI Sta: 20069.286 PC Sta: 19085.753 PT Sta: 20826.843 Delta: 66-30-17 Tangent: 983.533	N: 2571995.7509 N: 2571718.9932 N: 2571240.5669 Direction: Left Curve Length: 1741.090	E: 356458.3356 E: 357401.9858 E: 355828.2290 Radius: 1500.000 Exit.Dist: 293.694
Curve No : 8 Type : Spiral Curve	PI Sta: 23775.925 BTC Sta: 22591.804 BCC Sta: 22891.804 ECC Sta: 24457.897 ETC Sta: 24757.897	N: 2568976.1816 N: 2569885.3830 N: 2569660.6924 N: 2569152.4137 N: 2569200.8913	E: 353938.8825 E: 354697.4974 E: 354498.8638 E: 353072.2359 E: 352776.2780
	Circular Curve Data Delta: 61-5-55 Tangent: 1184.121	Direction: Right Curve Length: 1566.094	Radius: 1750.000 Exit.Dist: 282.412
	Spiral Curve Data Spiral Length: 300.000 Radius: 1750.000 Theta: 4-54-40	XM: 149.959 TK: 100.067 TL: 200.080	X: 299.780 Y: 8.567 A: 724.569
End Station:	Sta: 26225.051	N: 2569479.2875	E: 351335.91
Contractor	Page No 2		Consultant

## Horizontal Alignment Reports - Setting out Report

Horizontal Alignment Report Setting Out Data's						
Station	Right Side		Center Line		Left Side	
	Offset :7.5m	Offset :7.5m	Offset :7.5m	Offset :7.5m	Offset :7.5m	Offset :7.5m
	Northing	Easting	Northing	Easting	Northing	Easting
2000.000	2575398.1212	365502.2088	2575398.6446	365509.6905	2575399.1680	365517.1722
2025.000	2575373.1822	365503.9534	2575373.7056	365511.4352	2575374.2290	365518.9169
2050.000	2575348.2431	365505.6981	2575348.7665	365513.1798	2575349.2899	365520.6615
2075.000	2575323.3041	365507.4428	2575323.8275	365514.9245	2575324.3509	365522.4062
2100.000	2575298.3650	365509.1874	2575298.8884	365516.6692	2575299.4118	365524.1509
2125.000	2575273.4260	365510.9321	2575273.9494	365518.4138	2575274.4728	365525.8955
2150.000	2575248.4869	365512.6768	2575249.0103	365520.1585	2575249.5337	365527.6402
2175.000	2575223.5479	365514.4214	2575224.0713	365521.9031	2575224.5947	365529.3849
2200.000	2575198.6088	365516.1661	2575199.1322	365523.6478	2575199.6556	365531.1295
2225.000	2575173.6698	365517.9108	2575174.1932	365525.3925	2575174.7166	365532.8742
2250.000	2575148.7307	365519.6554	2575149.2541	365527.1371	2575149.7775	365534.6188
2275.000	2575123.7917	365521.4001	2575124.3151	365528.8818	2575124.8385	365536.3635
2300.000	2575098.8526	365523.1447	2575099.3760	365530.6265	2575099.8994	365538.1082
2325.000	2575073.9136	365524.8894	2575074.4370	365532.3711	2575074.9604	365539.8528
2350.000	2575048.9745	365526.6341	2575049.4979	365534.1158	2575050.0213	365541.5975
					2575025.0823	365543.3422
					2575000.1432	365545.0868
					2574975.2042	365546.8315
					2574950.2651	365548.5762
					2574925.3261	365550.3208
					2574900.3874	365552.0654
					2574875.3352	365553.8101
					2574850.2938	365554.8971
					2574825.2407	365555.9426
					2574800.1784	365556.7375
					2574775.1094	365557.2818
					2574750.0362	365557.5703
					2574724.9613	365557.6181
					2574699.8873	365557.4102
					2574674.8165	365556.9515
						Consultant

### Report in PDF

Report in Excel

HORIZONTAL STATION AND CURVES REPORT						
Station	Right Side		Center Line		Left Side	
	Offset:7.5m	Offset:7.5m	Offset:7.5m	Offset:7.5m	Offset:7.5m	Offset:7.5m
	Northing	Easting	Northing	Easting	Northing	Easting
2000	2575398.1212	365502.2088	2575398.6446	365509.6905	2575399.1680	365517.1722
2025	2575373.1822	365503.9534	2575373.7056	365511.4352	2575374.2290	365518.9169
2050	2575348.2431	365505.6981	2575348.7665	365513.1798	2575349.2899	365520.6615
2075	2575323.3041	365507.4428	2575323.8275	365514.9245	2575324.3509	365522.4062
2100	2575298.3650	365509.1874	2575298.8884	365516.6692	2575299.4118	365524.1509
2125	2575273.4260	365510.9321	2575273.9494	365518.4138	2575274.4728	365525.8955
2150	2575248.4869	365512.6768	2575249.0103	365520.1585	2575249.5337	365527.6402
2175	2575223.5479	365514.4214	2575224.0713	365521.9031	2575224.5947	365529.3849
2200	2575198.6088	365516.1661	2575199.1322	365523.6478	2575199.6556	365531.1295
2225	2575173.6698	365517.9108	2575174.1932	365525.3925	2575174.7166	365532.8742
2250	2575148.7307	365519.6554	2575149.2541	365527.1371	2575149.7775	365534.6188
2275	2575123.7917	365521.4001	2575124.3151	365528.8818	2575124.8385	365536.3635
2300	2575098.8526	365523.1447	2575099.3760	365530.6265	2575099.8994	365538.1082
2325	2575073.9136	365524.8894	2575074.4370	365532.3711	2575074.9604	365539.8528
2350	2575048.9745	365526.6341	2575049.4979	365534.1158	2575050.0213	365541.5975
2375	2575024.0355	365528.3787	2575024.5589	365535.8604	2575025.0823	365543.3422
2400	2574999.0964	365530.1234	2574999.6198	365537.6051	2575000.1432	365545.0868
2425	2574974.1574	365531.8681	2574974.6808	365539.3498	2574975.2042	365546.8315
2450	2574949.2183	365533.6127	2574949.7417	365541.0944	2574950.2651	365548.5762

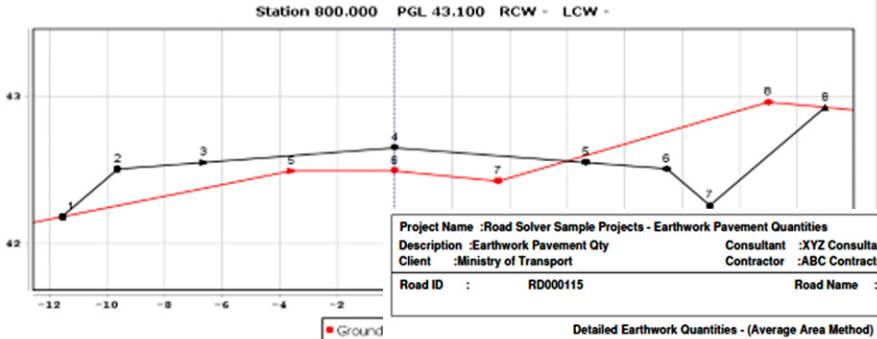
# 21. ROAD SOLVER REPORT MODELS ( CONT.,)

## Road Cross Sections - Earthworks

Project Name :Road Solver Sample Projects - Earthwork Pavement Quantities  
 Description :Earthwork Pavement Qty Consultant :XYZ Consultant  
 Client :Ministry of Transport Contractor :ABC Contractor

Road ID : RD000115 Road Name : New Road Earthwork and Pavement Quantities

Detailed Earthwork Quantities - (Average Area Method)

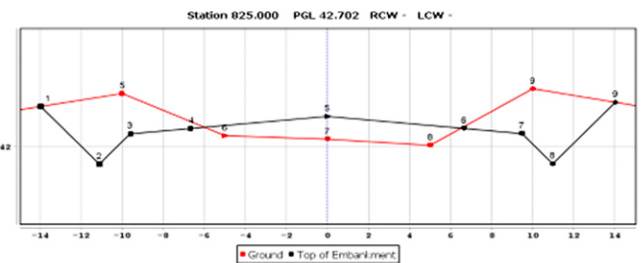


Project Name :Road Solver Sample Projects - Earthwork Pavement Quantities  
 Description :Earthwork Pavement Qty Consultant :XYZ Consultant  
 Client :Ministry of Transport Contractor :ABC Contractor

Road ID : RD000115 Road Name : New Road Earthwork and Pavement Quantities

Detailed Earthwork Quantities - (Average Area Method)

Ground Level			Top Of Embankment		
No	Dist	Eleva.	No	Dist	EI
1	-40.000	42.001	1	-11.509	42
2	-33.600	42.201	2	-9.617	42
3	-23.600	42.501	3	-6.650	42
4	-13.600	42.101	4	0.000	42
5	-3.600	42.493	5	6.650	42
6	0.000	42.493	6	9.467	42
7	3.600	42.423	7	10.967	42
8	13.000	42.961	8	14.972	42
9	23.000	42.781			
10	33.000	42.481			
11	43.000	42.401			
12	50.000	42.341			



Earthwork Volumes

Current Area	Current Volume	Dist	Previous Volume	Previous Area
2.568	50.378	25.000	0.000	1.462
-2.390	-69.182	25.000	0.000	-3.145

Earthwork Summary

Total Fill	50.378
Total Cut	-69.182
Cumm.Fill	247.306
Cumm.Cut	-340.272

Ground Level			Top Of Embankment			Intersection Points		
No	Dist	Eleva.	No	Dist	Eleva.	No	Dist	Eleva.
1	-50.000	40.991	1	-13.972	42.334	1	-3.990	42.162
2	-40.000	41.201	2	-11.117	41.828	2	0.508	42.154
3	-30.000	41.361	3	-9.617	42.108			
4	-20.000	42.171	4	-6.650	42.152			
5	-10.000	42.441	5	0.000	42.252			
6	-5.000	42.093	6	6.650	42.152			
7	0.000	42.003	7	9.467	42.110			
8	5.000	42.013	8	10.967	41.860			
9	10.000	42.481	9	14.018	42.368			
10	20.000	42.201						
11	30.000	42.121						
12	40.000	42.041						
13	50.000	42.041						

Earthwork Volumes

Current Area	Current Volume	Dist	Previous Volume	Previous Area
1.729	53.719	25.000	0.000	2.568
-4.109	-81.228	25.000	0.000	-2.390

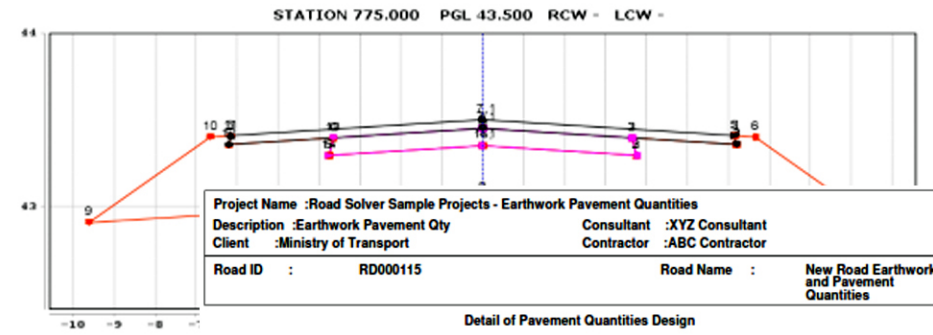
Earthwork Summary

Total Fill	53.719
Total Cut	-81.228
Cumm.Fill	301.025
Cumm.Cut	-421.500

Project Name :Road Solver Sample Projects - Earthwork Pavement Quantities  
 Description :Earthwork Pavement Qty Consultant :XYZ Consultant  
 Client :Ministry of Transport Contractor :ABC Contractor

Road ID : RD000115 Road Name : New Road Earthwork and Pavement Quantities

Detail of Pavement Quantities Design

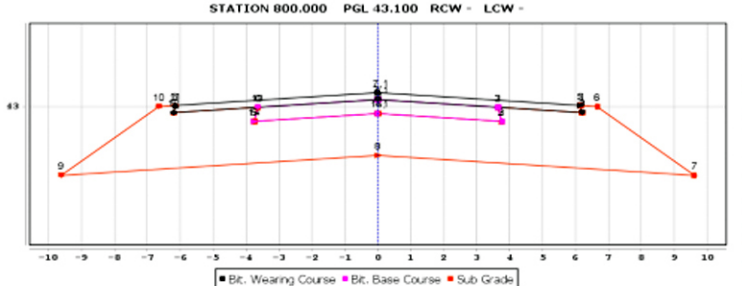


Project Name :Road Solver Sample Projects - Earthwork Pavement Quantities  
 Description :Earthwork Pavement Qty Consultant :XYZ Consultant  
 Client :Ministry of Transport Contractor :ABC Contractor

Road ID : RD000115 Road Name : New Road Earthwork and Pavement Quantities

Detail of Pavement Quantities Design

Bit. Wearing Course			Bit. Base Course			Sub Grade		
No	Dist	Eleva	No	Dist	Eleva	No	Dist	Eleva
1	0.000	43.500	1	0.000	43.050	1	0.000	42.950
2	6.150	43.408	2	3.650	42.995	2	3.752	42.894
3	6.201	43.357	3	3.752	42.894	3	3.650	42.995
4	0.000	43.450	4	0.000	42.950	4	6.201	42.957
5	-2.201	43.357	5	-3.752	42.894	5	6.150	43.000
6	-6.150	43.408	6	-3.650	42.995	6	6.050	43.000
7	0.000	43.500	7	0.000	43.050	7	9.617	42.506



Bit. Wearing Course			Bit. Base Course			Sub Grade		
No	Dist	Eleva	No	Dist	Eleva	No	Dist	Eleva
1	0.000	43.100	1	0.000	43.050	1	0.000	42.950
2	6.150	43.008	2	3.650	42.995	2	3.752	42.894
3	6.201	42.957	3	3.752	42.894	3	3.650	42.995
4	0.000	43.050	4	0.000	42.950	4	6.201	42.957
5	-2.201	42.957	5	-3.752	42.894	5	6.150	43.000
6	-6.150	43.008	6	-3.650	42.995	6	6.050	43.000
7	0.000	43.100	7	0.000	43.050	7	9.617	42.506
8	0.000	42.850						
9	-9.617	42.506						
10	-6.650	43.000						
11	-6.150	43.008						
12	-2.201	42.957						
13	-3.650	42.995						
14	-3.752	42.894						
15	0.000	42.950						

Pavement Volumes

Pavements	Curr.Sec	Prev.Sec	Dist	Volume	Cumm.
Bit. Wearing Course	0.61901	0.61901	25.00000	15.47520	77.37690
Bit. Base Course	0.73824	0.73824	25.00000	18.45600	92.28000
Sub Grade	5.96040	5.96040	25.00000	149.00920	745.04663



# 21. ROAD SOLVER REPORT MODELS ( CONT.,)

## Pavement Coat Quantities Report

Project Name :Road Solver Sample Projects - Earthwork Pavement Quantities								
Description :Earthwork Pavement Qty				Consultant :XYZ Consultant				
Client :Ministry of Transport			Contractor :ABC Contractor					
Road ID :	RD000115			Road Name :	New Road Earthwork and Pavement Quantities			
<b>Pavement Coat Quantities-Bit. Base Course Prime Coat ( MC1 )</b>								
Station	Dist	Mini.L	Max.L	Add.Length	Total Length	Avg.Length	Total Area	Cumm Area
1300.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	4815.000
1325.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	5007.600
1350.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	5200.200
1375.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	5392.800
1400.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	5585.400
1425.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	5778.000
1450.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	5970.600
1475.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	6163.200
1500.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	6355.800
1525.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	6548.400
1550.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	6741.000
1575.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	6933.600
1600.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	7126.200
1625.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	7318.800
1650.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	7511.400
1675.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	7704.000
1700.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	7896.600
1725.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	8089.200
1750.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	8281.800
1775.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	8474.400
1800.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	8667.000
1825.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	8859.600
1850.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	9052.200
1875.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	9244.800
1900.000	25.000	-3.752	3.752	0.20	7.704	7.704	192.600	9437.400

Contractor

Page No 2 of 3

Consultant

## Work Limit & Cut Fill Area Report

Project Name :Road Solver Sample Project - Pavement and Embankment Levels				
Description :Pave and Embank Levels			Consultant :XYZ Consultant	
Client :Ministry of Transport		Contractor :ABC Contractor		
Road ID :	RD000118		Road Name :	Road No 1 Pave and Embk Levels
<b>SLOPE STAKE REPORT</b>				
STATION	LEFT SIDE		RIGHT SIDE	
	DIST	CASE	DIST	CASE
0	-14.827	Cut	14.562	Cut
25	-14.695	Cut	16.066	Cut
50	-13.177	Cut	13.227	Cut
75	-13.061	Cut	14.23	Cut
100	-12.805	Cut	12.389	Cut
125	-13.323	Cut	13.991	Cut
150	-13.328	Cut	13.978	Cut
175	-13.004	Cut	13.467	Cut
200	-12.276	Cut	13.143	Cut
225	-11.493	Fill	12.931	Cut
250	-21.737	Fill	10.211	Fill
275	-20.08	Fill	9.08	Fill
300	-20.752	Fill	11.693	Fill
325	-19.031	Fill	11.991	Fill
350	-14.831	Fill	14.688	Fill
375	-16.098	Fill	13.053	Fill
400	-23.811	Fill	15.383	Fill
425	-24.322	Fill	13.108	Fill
450	-23.736	Fill	13.399	Fill
475	-22.07	Fill	13.789	Fill
500	-22.306	Fill	13.993	Fill
525	-20.334	Fill	14.005	Fill
550	-14.336	Fill	14.176	Fill
575	-20.705	Fill	14.212	Fill
600	-19.337	Fill	14.392	Fill
625	-14.903	Fill	14.251	Fill
650	-14.689	Fill	11.979	Fill
675	-14.08	Fill	12.195	Fill
700	-14.097	Fill	13.511	Fill
725	-13.644	Fill	13.683	Fill
750	-13.588	Fill	16.368	Fill

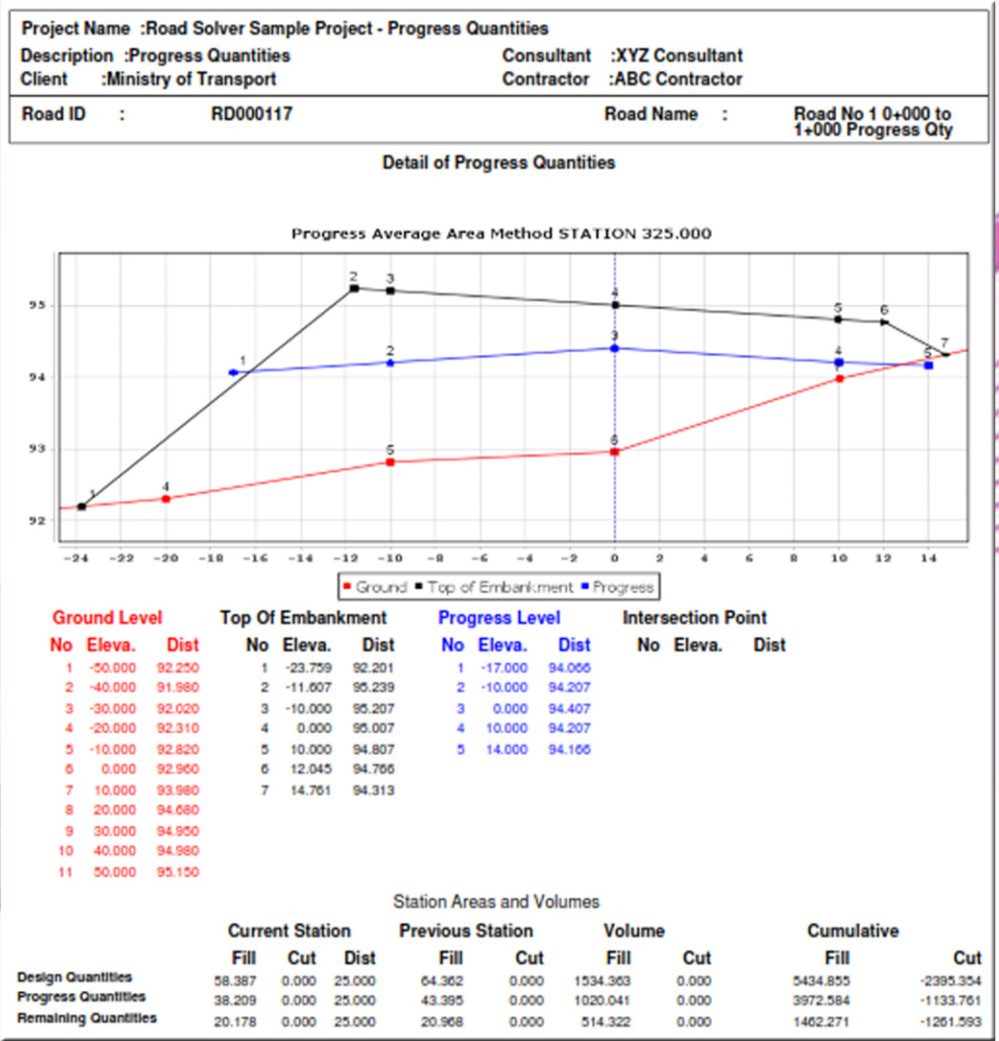
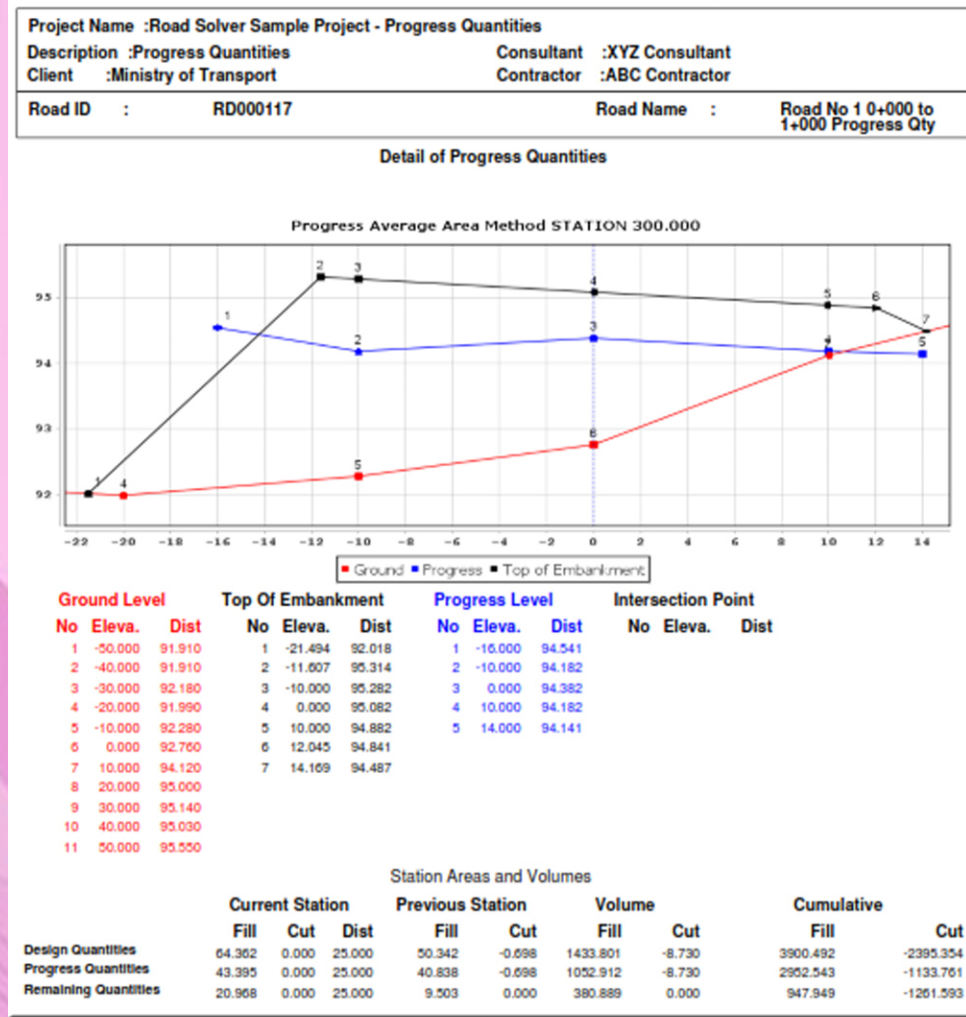
Contractor

Page No 1 of 6

Consultant

# 21. ROAD SOLVER REPORT MODELS ( CONT.,)

# Earthwork Progress Quantity Reports



# 21. ROAD SOLVER REPORT MODELS ( CONT.,)

## Vertical Alignment Data ( PGL ) Reports

Project Name :Road Solver Sample Projects - Vertical Alignments  
 Description :Vertical Alignment Consultant :XYZ Consultant  
 Client :Ministry of Transport Contractor :ABC Contractor

Road ID : RD000112 Road Name : Road No 1 - Vertical Alignments Model 1

**Vertical Alignment Report  
Profile Grade Level**

Station	Elevation
0.000	100.357
25.000	100.400
50.000	100.442
75.000	
100.000	
125.000	
150.000	
175.000	
200.000	
225.000	
250.000	
275.000	
300.000	
325.000	
350.000	
375.000	
400.000	
425.000	
450.000	
475.000	
500.000	
525.000	
550.000	
575.000	
600.000	

PGL Report - PDF

Project Name :Road Solver Sample Projects - Vertical Alignments  
 Description :Vertical Alignment Consultant :XYZ Consultant  
 Client :Ministry of Transport Contractor :ABC Contractor

Road ID : RD000112 Road Name : Road No 1 - Vertical Alignments Model 1

**Vertical Alignment Report  
Station and Curves**

Start Station	Elevation	Lvc
0	100.357	0
Curve No : 1	PVC Station : 775.378	PVT Elevation : 101.677
Type : Crest Curve	PVT Station : 1075.378	PVT Elevation : 101.668
PVI Station : 925.378	Grade in (%) : 0.17023	Radius : 85770.353
PVI Elevation : 101.632	Grade out (%) : -0.17532	K Value : 865.704
LVC : 300.000	Change (%) : -0.34654	Mid Ordinate : 0.130
Curve No : 2	PVC Station : 2489.444	PVT Elevation : 99.174
Type : Sag Curve	PVT Station : 2989.444	PVT Elevation : 99.193
PVI Station : 2739.444	Grade in (%) : -0.17632	Radius : 139866.171
PVI Elevation : 96.734	Grade out (%) : 0.18369	Radius : 263796.333
LVC : 500.000	Change (%) : -0.03585	K Value : 2637.863
Curve No : 3	PVC Station : 5742.145	PVT Elevation : 104.249
Type : Crest Curve	PVT Station : 6242.145	PVT Elevation : 104.694
PVI Station : 5992.145	Grade in (%) : 0.18369	Radius : 263796.333
PVI Elevation : 106.709	Grade out (%) : -0.03585	K Value : 2637.863
LVC : 500.000	Change (%) : -0.18954	Mid Ordinate : 0.118
Curve No : 4	PVC Station : 9412.389	PVT Elevation : 104.509
Type : Crest Curve	PVT Station : 9912.389	PVT Elevation : 103.216
PVI Station : 9662.389	Grade in (%) : -0.00585	Radius : 98949.379
PVI Elevation : 103.116	Grade out (%) : -0.51116	K Value : 969.494
LVC : 400.000	Change (%) : -0.50531	Mid Ordinate : 0.315
10790.650	PVC Elevation : 98.727	
11290.650	PVT Elevation : 99.220	
-0.51116	Radius : 40961.202	
0.70862	K Value : 409.912	
1.21977	Mid Ordinate : -0.762	
13194.403	PVC Elevation : 112.711	
14194.403	PVT Elevation : 114.663	
0.70862	Radius : 93734.676	
-1.06684	K Value : 937.347	
	Mid Ordinate : 0.334	
4477	Lvc : 0	

Vertical Curve Details

Project Name :Road Solver Sample Projects - Vertical Alignments  
 Description :Vertical Alignment Consultant :XYZ Consultant  
 Client :Ministry of Transport Contractor :ABC Contractor

Road ID : RD000112 Road Name : Road No 1 - Vertical Alignments Model 1

**Vertical Alignment Report  
Profile Grade Level**

Station	Elevation
0	100.357
25	100.400
50	100.442
75	100.485
100	100.527
125	100.570
150	100.612
175	100.655
200	100.697
225	100.740
250	100.783
275	100.825
300	100.868
325	100.910
350	100.953
375	100.995
400	101.038
425	101.080
450	101.123
475	101.166
500	101.208

PGL Report - Excel

## Super Elevation Calculation Reports

Project Name :Road Solver Sample Project - Using Variables Calculation  
 Description :Using Variables Calculation Consultant :XYZ Consultant  
 Client :Ministry of Transport Contractor :ABC Contractor

Road ID : RD000116 Road Name : Road No 1 using Variables

**Super Elevation Data's  
MCW Right**

Station	Slope (%)
2400.000	-1.500
2425.000	-1.500
2450.000	-1.500
2475.000	-1.500
2500.000	-1.500
2525.000	-1.500
2550.000	
2575.000	
2600.000	
2625.000	
2650.000	
2675.000	
2700.000	
2725.000	
2750.000	
2775.000	
2800.000	
2825.000	
2850.000	
2875.000	
2900.000	
2925.000	
2950.000	
2975.000	
3000.000	

Slope Report - PDF

Project Name :Road Solver Sample Project - Using Variables Calculation  
 Description :Using Variables Calculation Consultant :XYZ Consultant  
 Client :Ministry of Transport Contractor :ABC Contractor

Road ID : RD000116 Road Name : Road No 1 using Variables

**Super Elevation Data's  
MCW Right**

Station	Slope (%)
2400	-1.500
2425	-1.500
2450	-1.500
2475	-1.500
2500	-1.500
2525	-1.500
2550	-1.500
2575	-1.500
2600	-2.515
2625	-3.530
2650	-4.545
2675	-5.560
2700	-5.560
2725	-5.560
2750	-5.560
2775	-5.560
2800	-5.560
2825	-5.560
2850	-5.560
2875	-5.560
2900	-5.560
2925	-5.560
2950	-5.560
2975	-5.560
3000	-5.560

Slope Report - Excel

# 21. ROAD SOLVER REPORT MODELS ( CONT.,)

## Survey Layout Levels - Embankment Layer Report

Project Name :Road Solver Sample Project - Pavement and Embankment Levels										
Description :Pave and Embank Levels					Consultant :XYZ Consultant					
Client :Ministry of Transport					Contractor :ABC Contractor					
Road ID :	RD000118				Road Name :	Road No 1 Pave and Embk Levels				
<b>Embankment Layer Report</b>										
<b>5th Layer Embankment</b>										
Height From TOE :1 Interval of :2.50										
Station No	1	2	3	4	5	6	7	8	9	10
1250 Dist	-13.869	-12.500	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500
Elev.	79.752	79.772	79.809	79.846	79.884	79.921	79.959	79.921	79.884	79.846
No	11	12	13							
Dist	10.000	12.500	13.869							
Elev.	79.809	79.772	79.752							
Station No	1	2	3	4	5	6	7	8	9	10
1275 Dist	-13.869	-12.500	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500
Elev.	79.514	79.534	79.571	79.608	79.646	79.683	79.721	79.683	79.646	79.608
No	11	12	13							
Dist	10.000	12.500	13.869							
Elev.	79.571	79.534	79.514							
Station No	1	2	3	4	5	6	7	8	9	10
1300 Dist	-13.869	-12.500	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500
Elev.	79.315	79.335	79.372	79.409	79.447	79.484	79.522	79.484	79.447	79.409
No	11	12	13							
Dist	10.000	12.500	13.869							
Elev.	79.372	79.335	79.315							
Station No	1	2	3	4	5	6	7	8	9	10
1325 Dist	-13.869	-12.500	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500
Elev.	79.154	79.174	79.211	79.248	79.286	79.323	79.361	79.323	79.286	79.248
No	11	12	13							
Dist	10.000	12.500	13.869							
Elev.	79.211	79.174	79.154							
Station No	1	2	3	4	5	6	7	8	9	10
1350 Dist	-13.869	-12.500	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500
Elev.	79.031	79.051	79.088	79.125	79.163	79.200	79.238	79.200	79.163	79.125
No	11	12	13							
Dist	10.000	12.500	13.869							
Elev.	79.088	79.051	79.031							
Station No	1	2	3	4	5	6	7	8	9	10
1375 Dist	-13.869	-12.500	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500
Elev.	78.946	78.966	79.003	79.040	79.078	79.115	79.153	79.115	79.078	79.040
No	11	12	13							
Dist	10.000	12.500	13.869							
Elev.	79.003	78.966	78.946							
Station No	1	2	3	4	5	6	7	8	9	10
1400 Dist	-13.869	-12.500	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500
Elev.	78.900	78.920	78.957	78.994	79.032	79.069	79.107	79.069	79.032	78.994
No	11	12	13							
Dist	10.000	12.500	13.869							
Elev.	78.957	78.920	78.900							
Contractor			Page No 1				Consultant			

## Survey Layout Levels - Pavement Layer Report

Project Name :Road Solver Sample Project - Pavement and Embankment Levels										
Description :Pave and Embank Levels					Consultant :XYZ Consultant					
Client :Ministry of Transport					Contractor :ABC Contractor					
Road ID :	RD000118				Road Name :	Road No 1 Pave and Embk Levels				
<b>Pavement Layer Report</b>										
<b>Top of Agg. Base Course</b>										
Station No	1	2	3	4	5	6	7	8	9	10
1000 Dist	-10.152	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	10.000
Elev.	85.408	85.410	85.448	85.485	85.523	85.560	85.523	85.485	85.448	85.410
No	11									
Dist	10.152									
Elev.	85.408									
Station No	1	2	3	4	5	6	7	8	9	10
1012.5 Dist	-10.152	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	10.000
Elev.	85.146	85.148	85.186	85.223	85.261	85.298	85.261	85.223	85.186	85.148
No	11									
Dist	10.152									
Elev.	85.146									
Station No	1	2	3	4	5	6	7	8	9	10
1025 Dist	-10.152	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	10.000
Elev.	84.884	84.886	84.924	84.961	84.999	85.036	84.999	84.961	84.924	84.886
No	11									
Dist	10.152									
Elev.	84.884									
Station No	1	2	3	4	5	6	7	8	9	10
1037.5 Dist	-10.152	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	10.000
Elev.	84.623	84.625	84.663	84.700	84.738	84.775	84.738	84.700	84.663	84.625
No	11									
Dist	10.152									
Elev.	84.623									
Station No	1	2	3	4	5	6	7	8	9	10
1050 Dist	-10.152	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	10.000
Elev.	84.361	84.363	84.401	84.438	84.476	84.513	84.476	84.438	84.401	84.363
No	11									
Dist	10.152									
Elev.	84.361									
Station No	1	2	3	4	5	6	7	8	9	10
1062.5 Dist	-10.152	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	10.000
Elev.	84.099	84.101	84.139	84.176	84.214	84.251	84.214	84.176	84.139	84.101
No	11									
Dist	10.152									
Elev.	84.099									
Station No	1	2	3	4	5	6	7	8	9	10
1075 Dist	-10.152	-10.000	-7.500	-5.000	-2.500	0.000	2.500	5.000	7.500	10.000
Elev.	83.837	83.839	83.877	83.914	83.952	83.989	83.952	83.914	83.877	83.839
No	11									
Dist	10.152									
Elev.	83.837									
Contractor			Page No 1				Consultant			

## 22. APPROVAL - MINISTRY OF TRANSPORT - SAUDI ARABIA

### Approved Letter from MOT , Saudi Arabia

### Translated Version Copy

رقم الحاضر: ٢١٩٠٩  
التاريخ: ١٤٤٠/٠٧/٢١  
الموقعات: ١

وزارة النقل  
VISION 2030  
الإدارة العامة للتصميم

وزارة النقل  
TRANSPORT MINISTRY

الموضوع: اعتماد برنامج حساب الكميات

المحترمين

السادة المكتب الذهني للهندسة المدنية

السلام عليكم ورحمة الله وبركاته

إشارة الى خطابكم رقم ٢٠١٨ / ١ / ٩ تاريخ ١٤٤٠ / ١ / ٢١ هـ بخصوص البرنامج الخاص بحساب الكميات للإعمال الترابية للطرق Road Solver ونظراً بأن الوزارة تبحث عن البرامج التي تساعد على تطوير الأداء وسرعة إنجاز العمل ، فقد تم العرض على سعادة وكيل الوزارة لإنشاء الطرق لإعتماد هذا البرنامج ليكون من ضمن البرامج المعتمدة في حساب الكميات في مشاريع الطرق وقد وافق سعادتكم على اعتماد هذا البرنامج ، ضمن برامج حساب الكميات في مشاريع الطرق بالوزارة .

وتقبلوا أطيب تحياتي ...

مدير عام الإدارة العامة للتصميم  
لم اعتماد الخطاب إلكترونياً  
المهندس/ جبرين بن عايض العتيبي

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تلف: +966 11 4226711 فاكس: +966 11 4255705

رقم الحاضر: ٢١٩٠٩  
التاريخ: ١٤٤٠/٠٧/٢١  
الموقعات: ١

وزارة النقل  
VISION 2030  
الإدارة العامة للتصميم

وزارة النقل  
TRANSPORT MINISTRY

Subject : Acceptance of Quantities Accounting Program

Respected

Golden office of Civil Engineering,

Peace , mercy and blessing of God,

Reference to your letter dated 09-01-2018 hijiri 21-01-1440H regarding the program ROAD SOLVER for calculating Quantities of Road Work and a look that the ministry for programs that helping to develop performance and speed of completion of work , was presented to the under secretary of the ministry. To establish the ways to adopt this program to be among the programs adopted in the calculation of quantities in Road Projects. His excellency approved the adoption of this program, within the programs of quantities accounting in road projects in the ministry.

and , accept my best Regards..

Director General of the General Department of Design  
e-mail has been approved.  
Engineer / Jabreen bin Ayed Al Otaibi

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**System Requirements :**

**Operating System :** Microsoft Windows 7/8/10 ( 32/64 Bit )  
**CPU Type :** Intel Core i5 or Later  
**Memory :** 4GB RAM min. ( 8GB Recommended )  
**Display Resolution :** 1280 x 720 or greater  
**Disk Space :** 3 GB  
**Data Base Server :** My Sql 5.50 or later

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