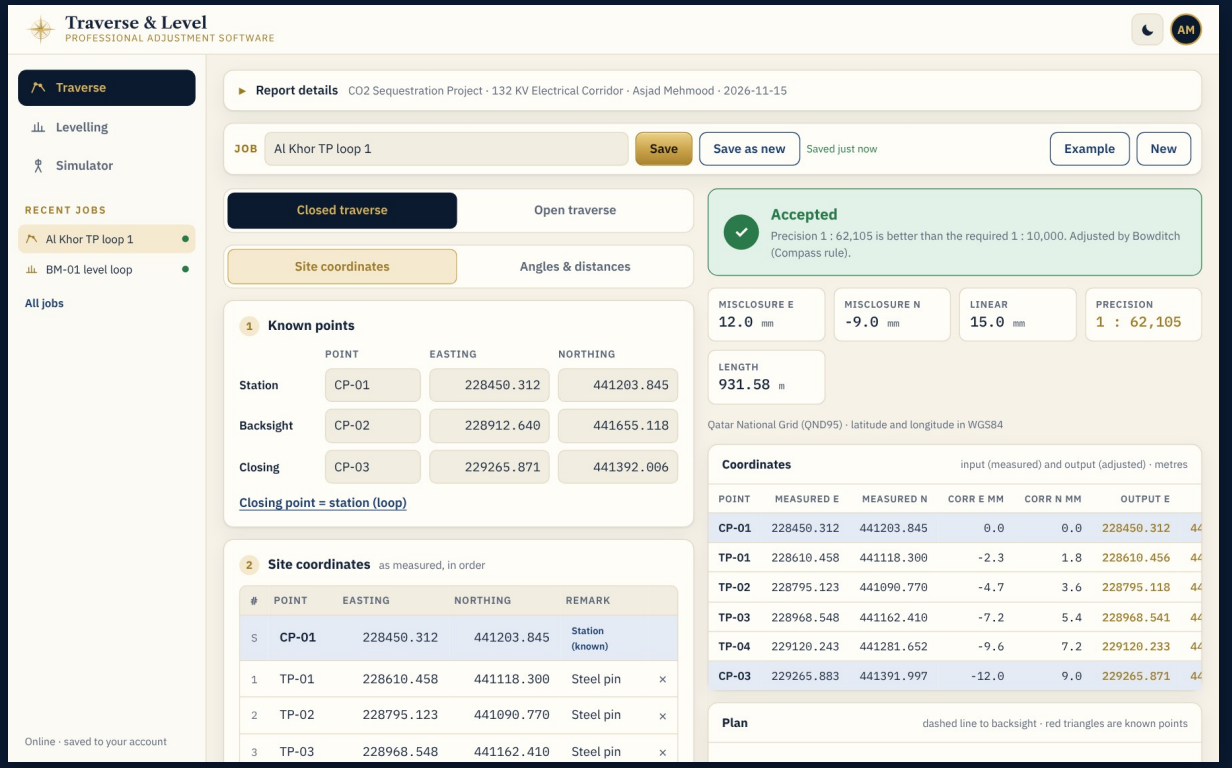
USER MANUAL

Traverse & Level Adjustment

Closed and open traverses, angles and distances, least squares, Qatar National Grid, levelling, simulator and PDF reports, explained screen by screen.



Version 2.2: sidebar, and back to your last job after login | November 2026

How to use this manual

Every screenshot carries red numbered boxes. Find the number on the picture, then read the note with the same number beside it.

1 Getting started

Account, sidebar and your last job

Slides 4-7

2 Closed traverse

Known points, readings, adjustment

Slides 8-16

3 Open traverse (new)

Optional closing point for checking and adjusting

Slides 17-22

4 Angles & distances

New: field book, least squares, Qatar grid

Slides 23-30

5 Levelling

Benchmarks, staff readings, reduced levels

Slides 31-35

6 Simulator, jobs and tips

Practice tool, dashboard, quick reference

Slides 36-42

TIP Results update as you type, so there is no Calculate button. Fix anything shown in red and the answer appears by itself.

What the software does

Traverse adjustment

Enter measured coordinates, or the angles and distances from the field book. The app checks the misclosure and adjusts by Bowditch, Transit, Equal or least squares.

Levelling

Reduce staff readings by Rise & Fall or Height of Instrument. It checks the arithmetic, compares the misclosure with the allowable value and adjusts the levels.

Traverse simulator

Watch a total station observe a traverse with realistic random errors, then send the result to the Traverse tool to practise adjusting it.

PDF, CSV and Google Earth

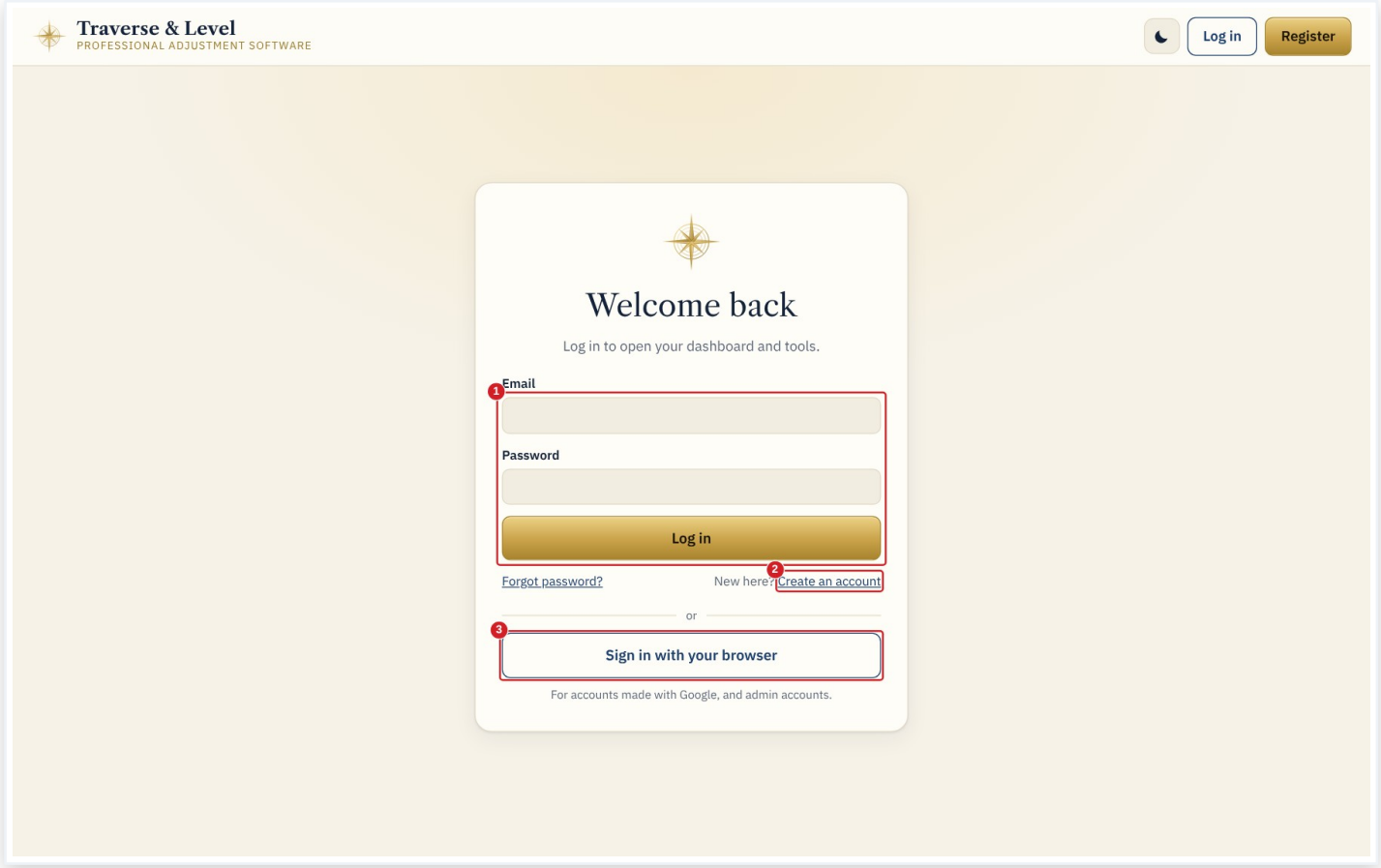
Saved jobs and offline use

Share jobs with colleagues

Light and dark themes

NEW Angles & distances field book with side shots and levels, least squares and Qatar National Grid (section 4). Open traverses can close on a known point (section 3).

The log-in screen



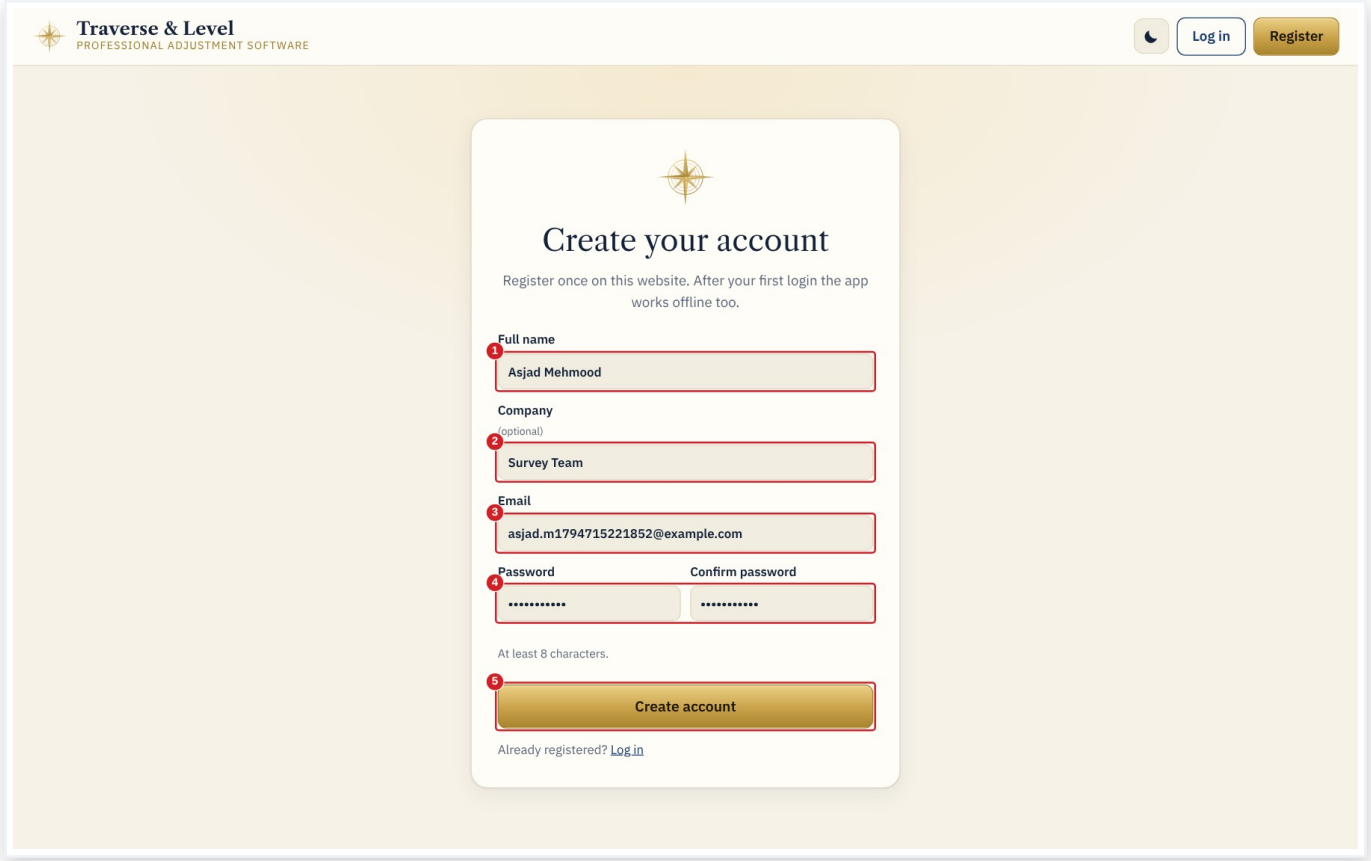
1 Log in
Enter your e-mail and password. After the first login the app also works offline.

2 Create an account
Opens the account form on the next slide. Registration is free.

3 Sign in with your browser
For accounts made with Google, and admin accounts: you confirm a code at exceltokml.com/link.

NOTE A yellow "Demo mode" bar means the account server is not connected. Accounts and jobs are then kept only on this computer.

Create your account



1. **Full name**
   Shown in the dashboard greeting and used as the Surveyor on reports.

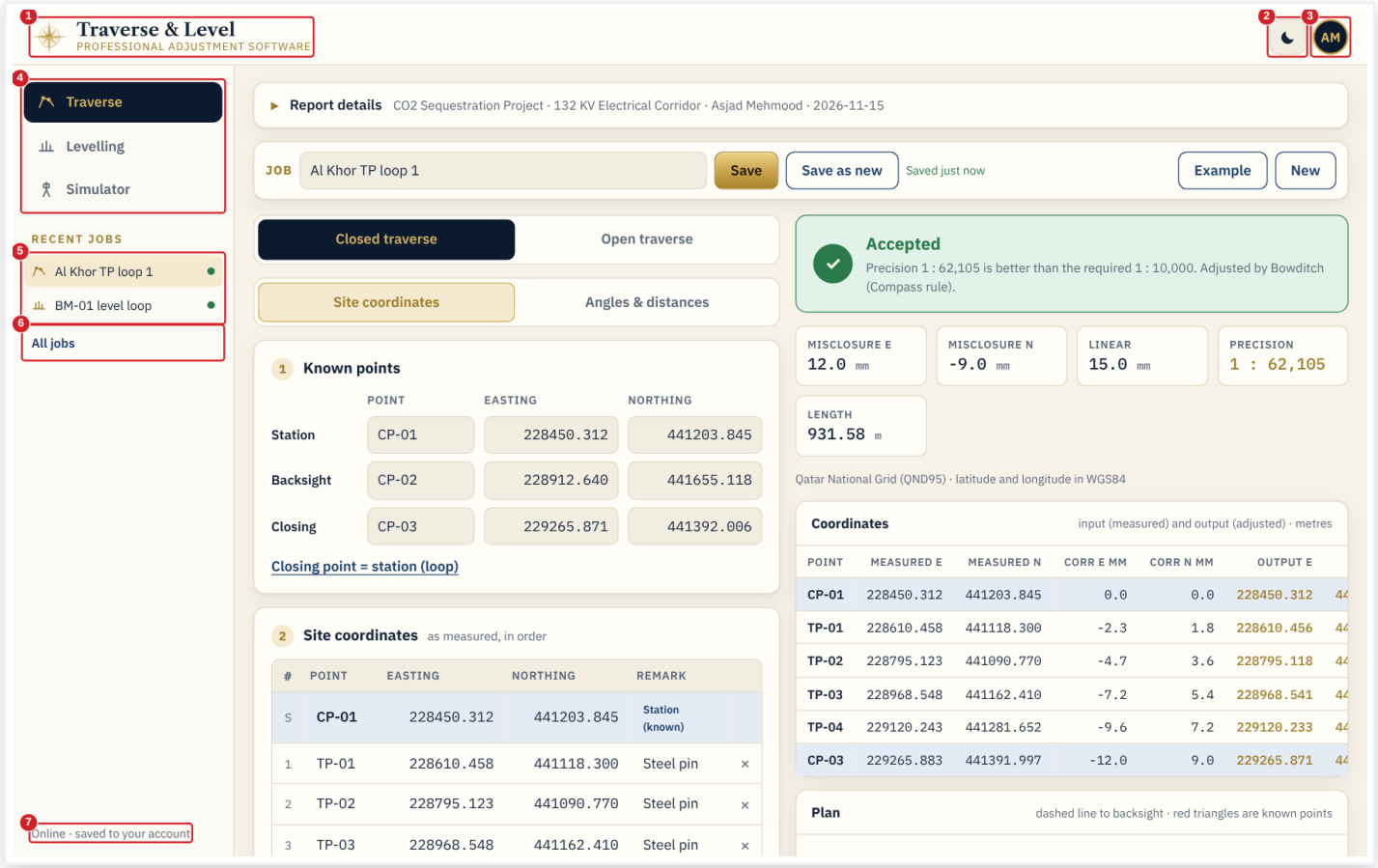
2. **Company (optional)**
   Free text for your organisation.

3. **E-mail**
   Your login name. Colleagues also use it to share jobs with you.

4. **Password and confirm**
   At least 8 characters. Both boxes must match or an error appears.

5. **Create account**
   Opens the Traverse tool, ready for your first job.

Top bar, sidebar and profile menu



1 App name
Click it to go back to the job you were working on.

2 Light / dark
Switches the colour theme. Your choice is remembered.

3 Profile menu
Your initials. Shows your name and e-mail, Dashboard and Log out.

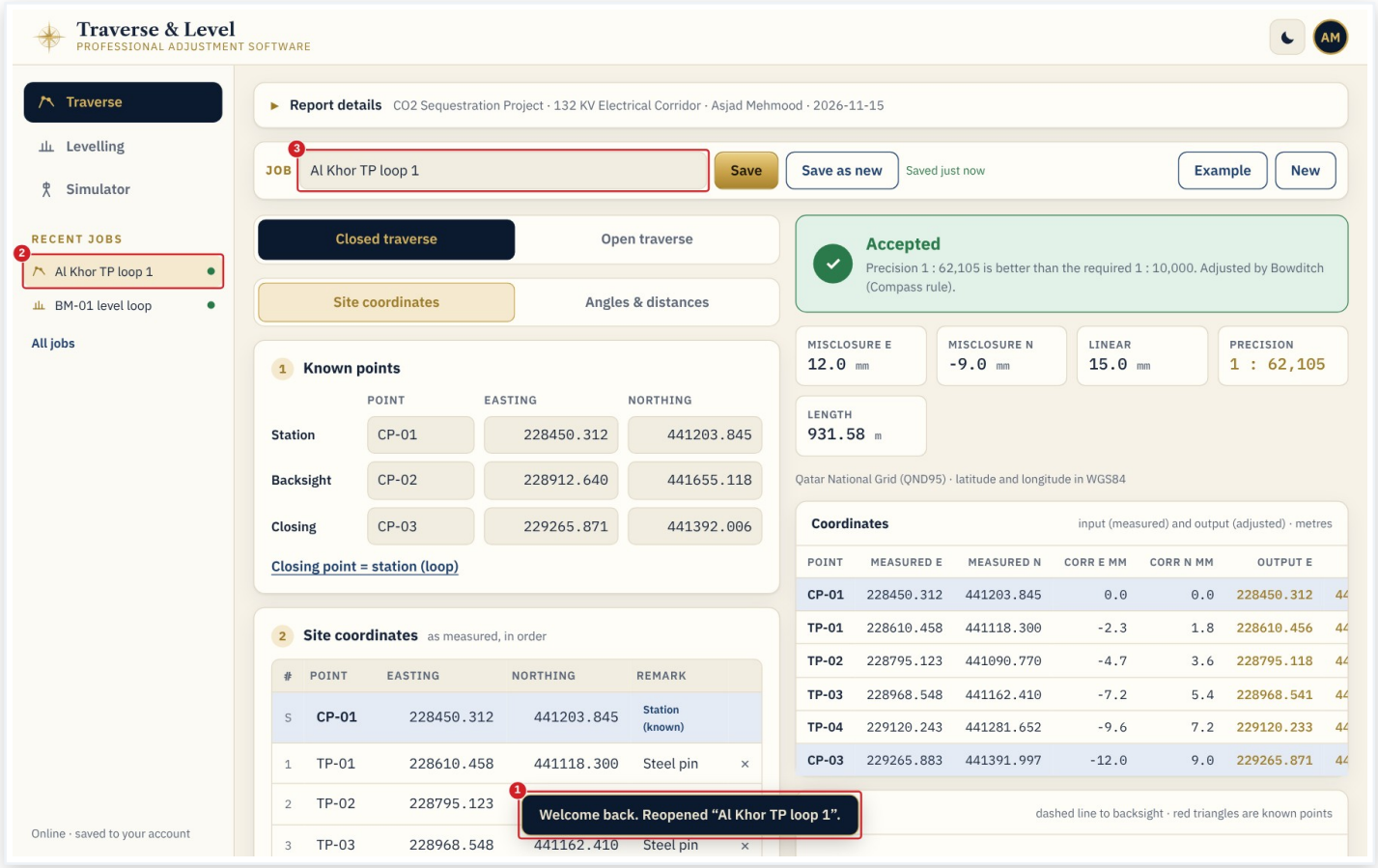
4 Tools
Traverse, Levelling and Simulator. The one you are in is dark.

5 Recent jobs
Your last six jobs, newest first. Click one to open it. The dot shows Accepted (green), Rejected (red) or Open (amber).

6 All jobs
Opens the dashboard with every job, jobs shared with you and your activity.

7 Connection
Online and saved to your account, or offline and saving on this device.

After you log in: back to your last job



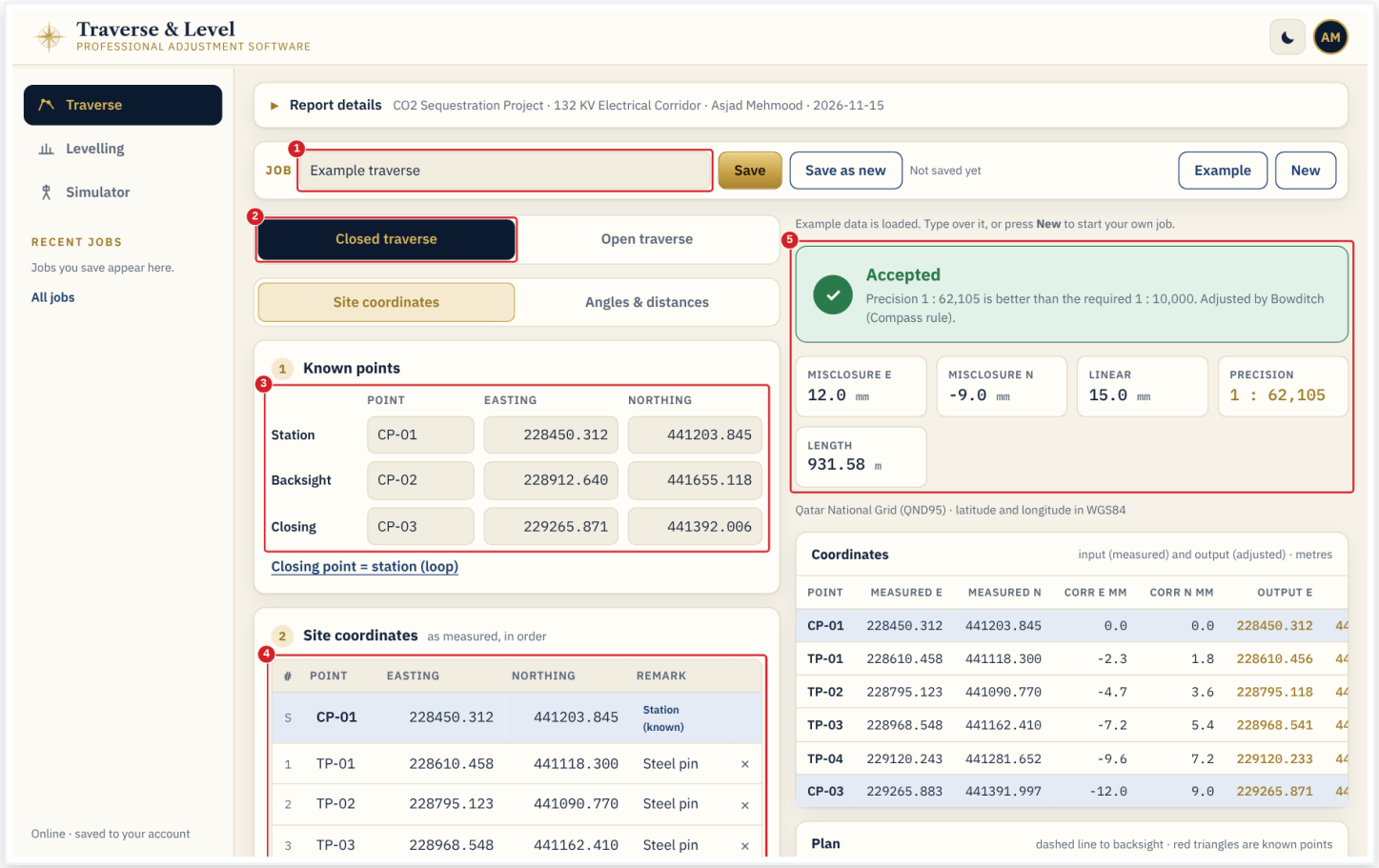
1 Welcome back
The app opens the tool and the job you had open last time, and says which job it reopened.

2 Marked in Recent jobs
The reopened job is highlighted in the sidebar.

3 Carry on
On the same computer your entries are as you left them, even changes not saved yet.

TIP The first time you log in, the Traverse tool opens. A link to a page, such as the dashboard, opens that page instead.

The Traverse screen



1 Job bar
Name, save, example and new.

2 Traverse type
Closed checks on a known point. Open is in section 3.

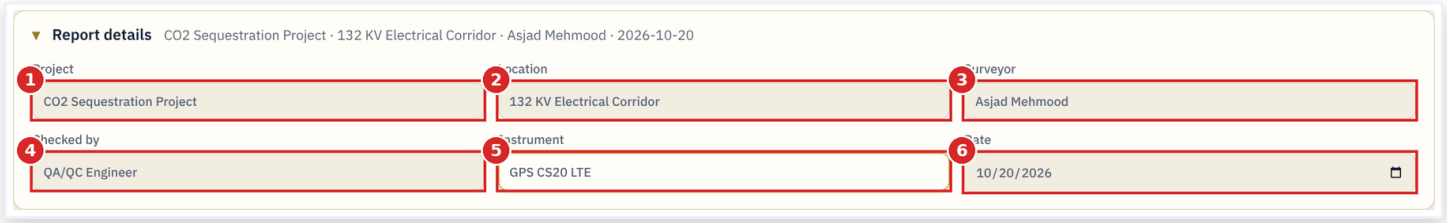
3 1 Known points
Station, backsight and closing point.

4 2 Site coordinates
Points as measured, in order observed.

5 Result panel
Updates live as you type.

TIP Your entries are saved on this device as you type, so closing the app does not lose work.

Report details



1. **Project**
   Printed at the top of every PDF report.

2. **Location**
   Site or corridor name.

3. **Surveyor**
   Your account name. Edit it if needed.

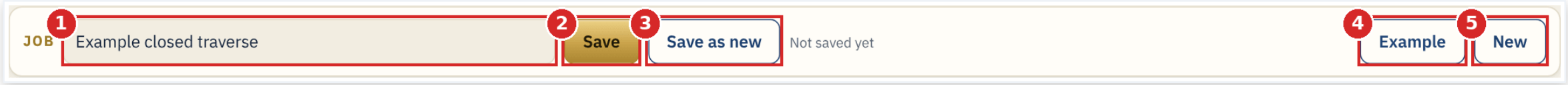
4. **Checked by**
   Checker or QA/QC engineer.

5. **Instrument**
   Total station or GPS model.

6. **Date**
   Today by default. Change with the calendar button.

TIP Click the "Report details" bar to open or close it. The same details are used on traverse and levelling reports.

Job bar: name, save, example, new



1 Job name

Type a name such as "Al Khor TP loop 1". If you leave it empty, one is made from the project and date.

2 Save

Stores the job under My jobs on the Dashboard. The text beside it shows Not saved yet, Unsaved changes or Saved.

3 Save as new

Makes a separate copy with "(copy)" added, so you can try a variation.

4 Example

Loads sample data for the traverse type you have selected, closed or open.

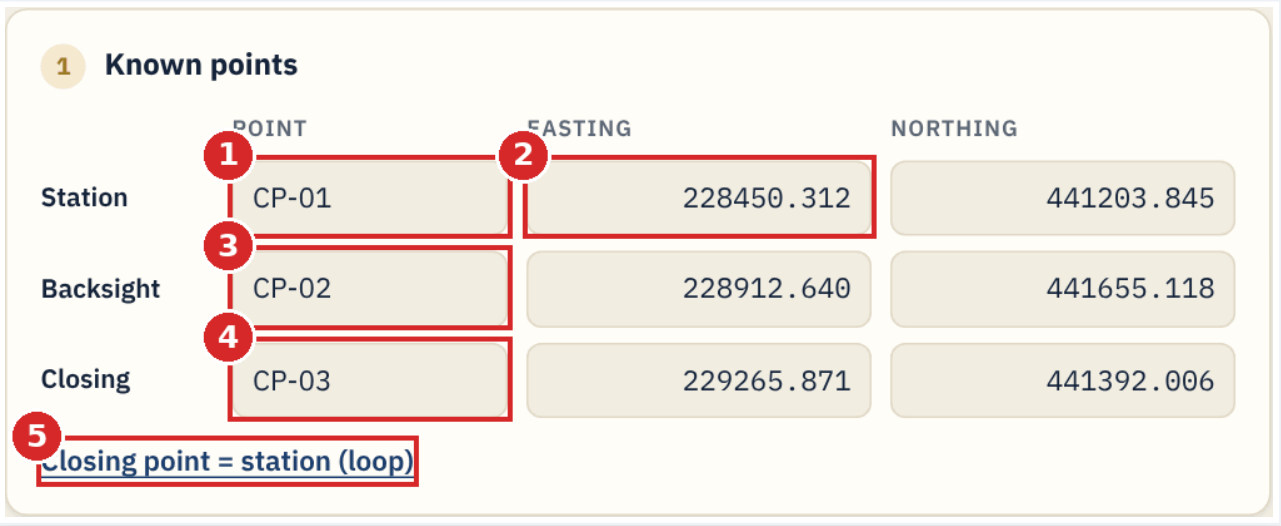
5 New

Clears the screen after you confirm with Start new. Unsaved changes are lost.



Traverse type switch. Choose Closed traverse or Open traverse. Your known points and readings stay when you switch.

Step 1: Known points



1. **Station name**
   The known point where the traverse starts, for example CP-01.

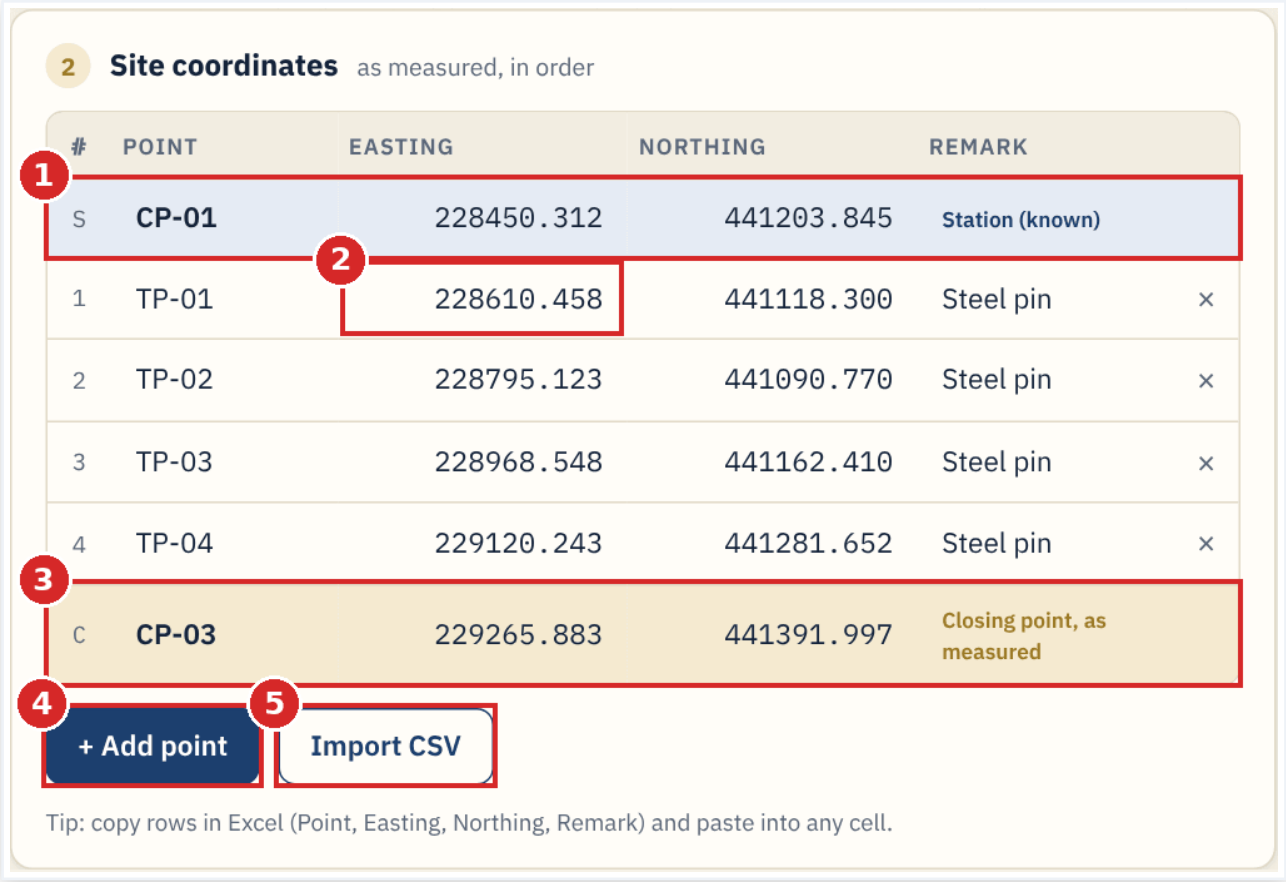
2. **Station Easting and Northing**
   Known coordinates in metres. Commas and spaces are accepted. A box turns red if it is not a number.

3. **Backsight name**
   A second known point that gives the starting direction. It must not have the same coordinates as the station.

4. **Closing name**
   The known point where the traverse ends. It is used for the closure check.

5. **Closing point = station (loop)**
   One click copies the station into the closing point for a loop that returns to the start.

Step 2: Site coordinates



1 Row S: station
Known station coordinates from step 1. Not editable here.

2 Traverse rows
One row per point, in order. The x deletes a row.

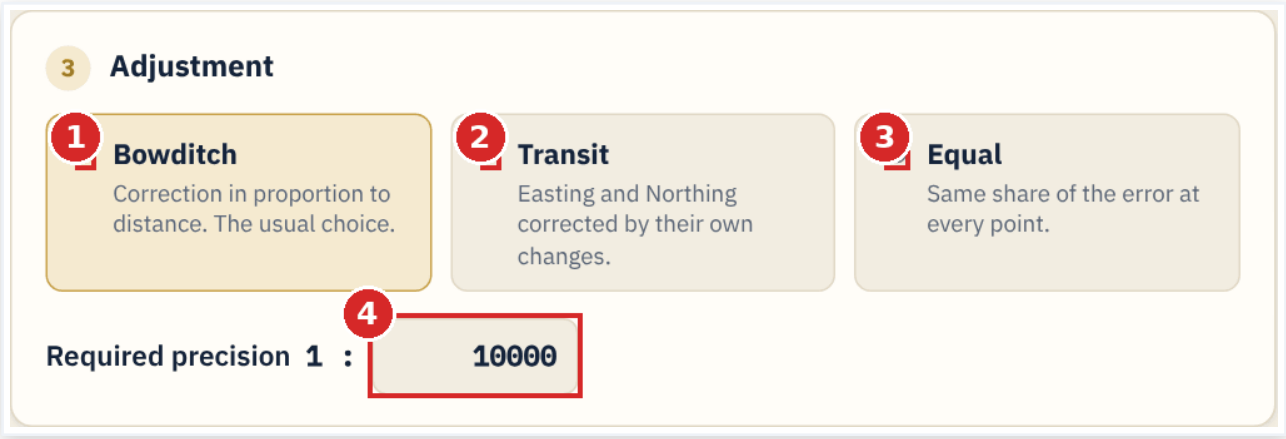
3 Row C: closing point
Coordinates as measured on site, not the known values.

4 + Add point
Adds an empty row at the bottom.

5 Import CSV
Loads Point, Easting, Northing, Remark.

TIP Copy rows in Excel (Point, Easting, Northing, Remark) and paste into any cell. The rows fill automatically.

Step 3: Adjustment method and precision



1 Bowditch (compass rule)
The usual choice. Each correction is in proportion to the distance travelled.

2 Transit
Easting and Northing are corrected in proportion to their own changes. It needs some change in both directions.

3 Equal
Every point receives the same share of the error.

4 Required precision 1 : N
Type N only, for example 10000 for 1:10,000. The result is accepted when the achieved precision is equal or better.

TIP Use the method your specification asks for. The default is Bowditch.

Reading the result



1. **Status banner**
   Green Accepted when the achieved precision is equal to or better than required, for example 1 : 62,105 against 1 : 10,000.

2. **Misclosure tiles**
   Misclosure E and N and the linear misclosure in millimetres, the precision achieved, and the total traverse length.

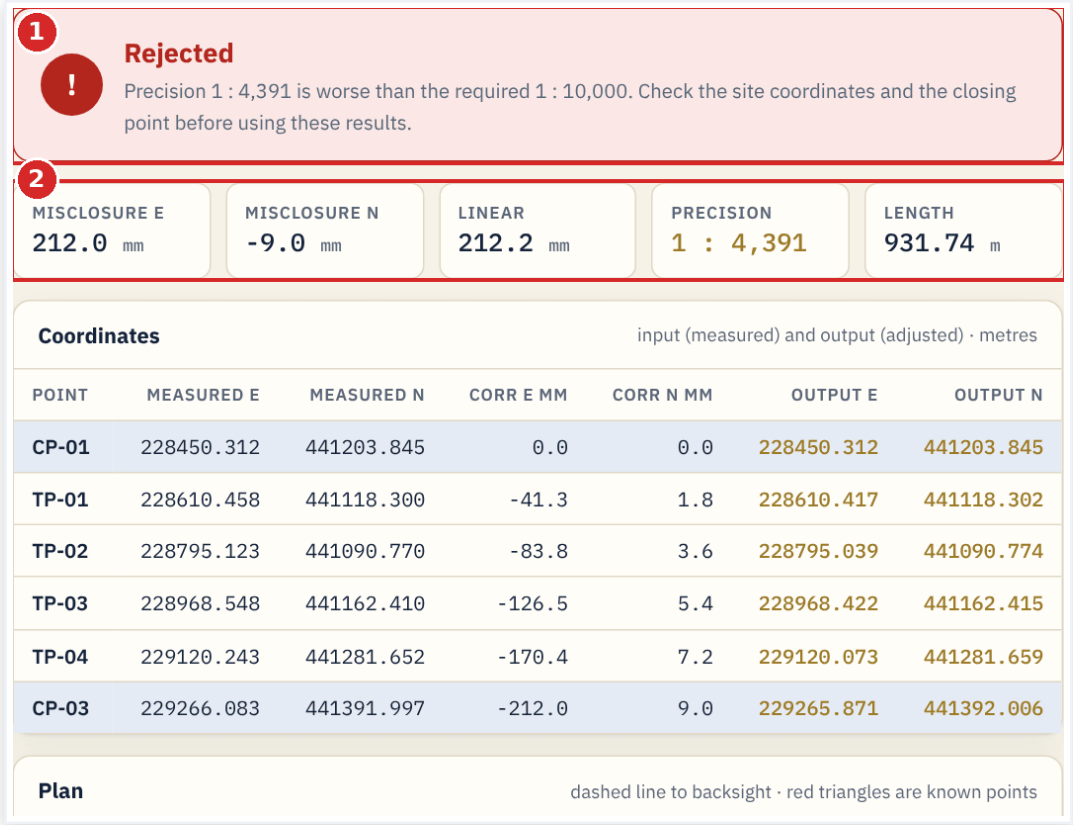
3. **Coordinates table**
   Measured E and N, the corrections in millimetres, and the Output E and N. Use the Output (adjusted) columns.

4. **Plan sketch**
   Gold line is adjusted, dashed line is as measured, red triangles are known points, dotted line goes to the backsight.

5. **PDF report**
   Creates the signed-off report for the job.

6. **Coordinates CSV**
   Exports the table for Excel or CAD.

When the result is rejected

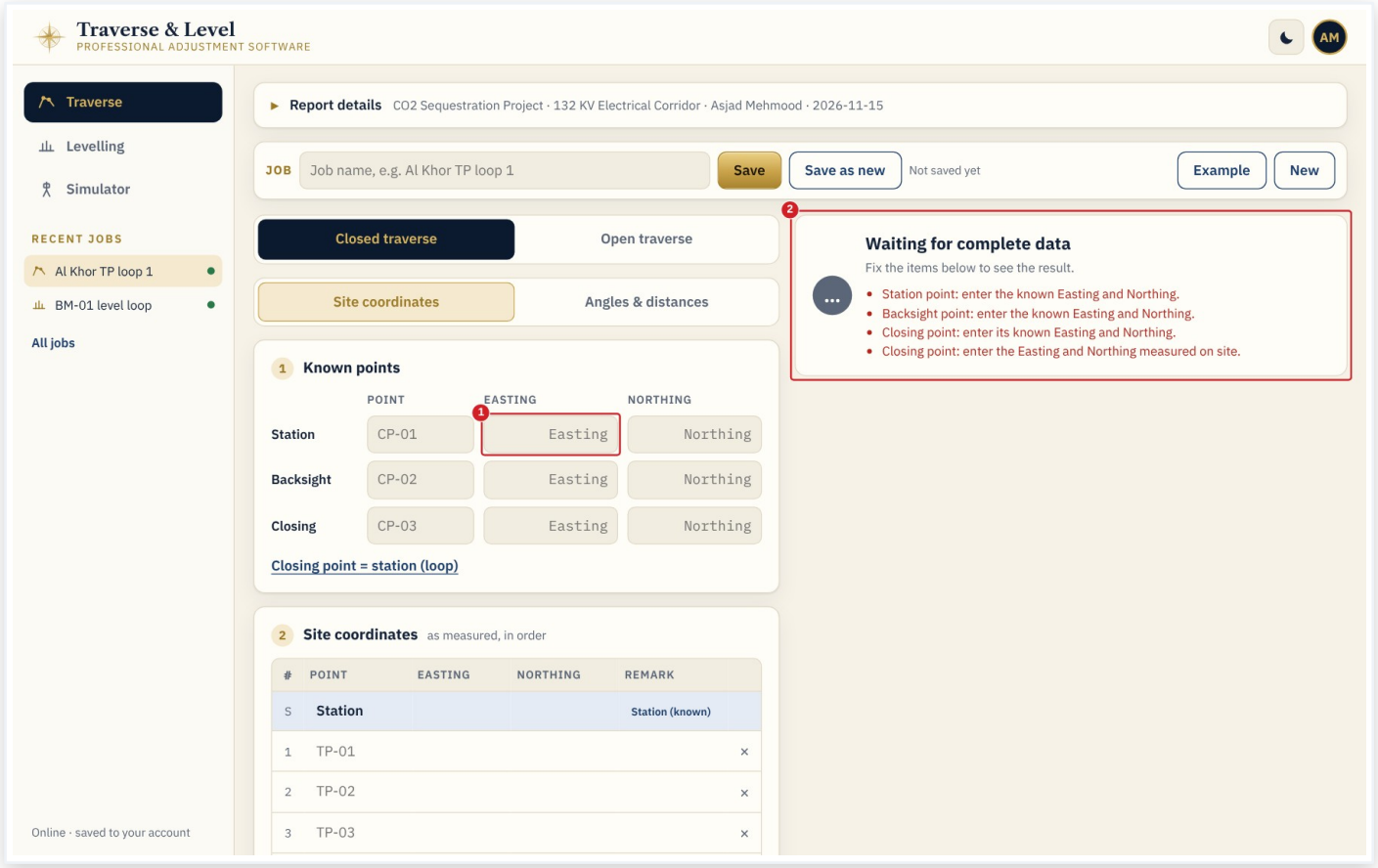


1. **Red Rejected banner**
   The achieved precision is worse than required. Here 1 : 4,391 against 1 : 10,000.

2. **Misclosure tiles**
   Show how large the error is. Linear misclosure 212.0 mm on 931.74 m is too large for 1 : 10,000.

NOTE Do not use rejected results. Check that known and measured closing values are not swapped, re-check typed coordinates, then re-observe if needed.

Waiting for complete data

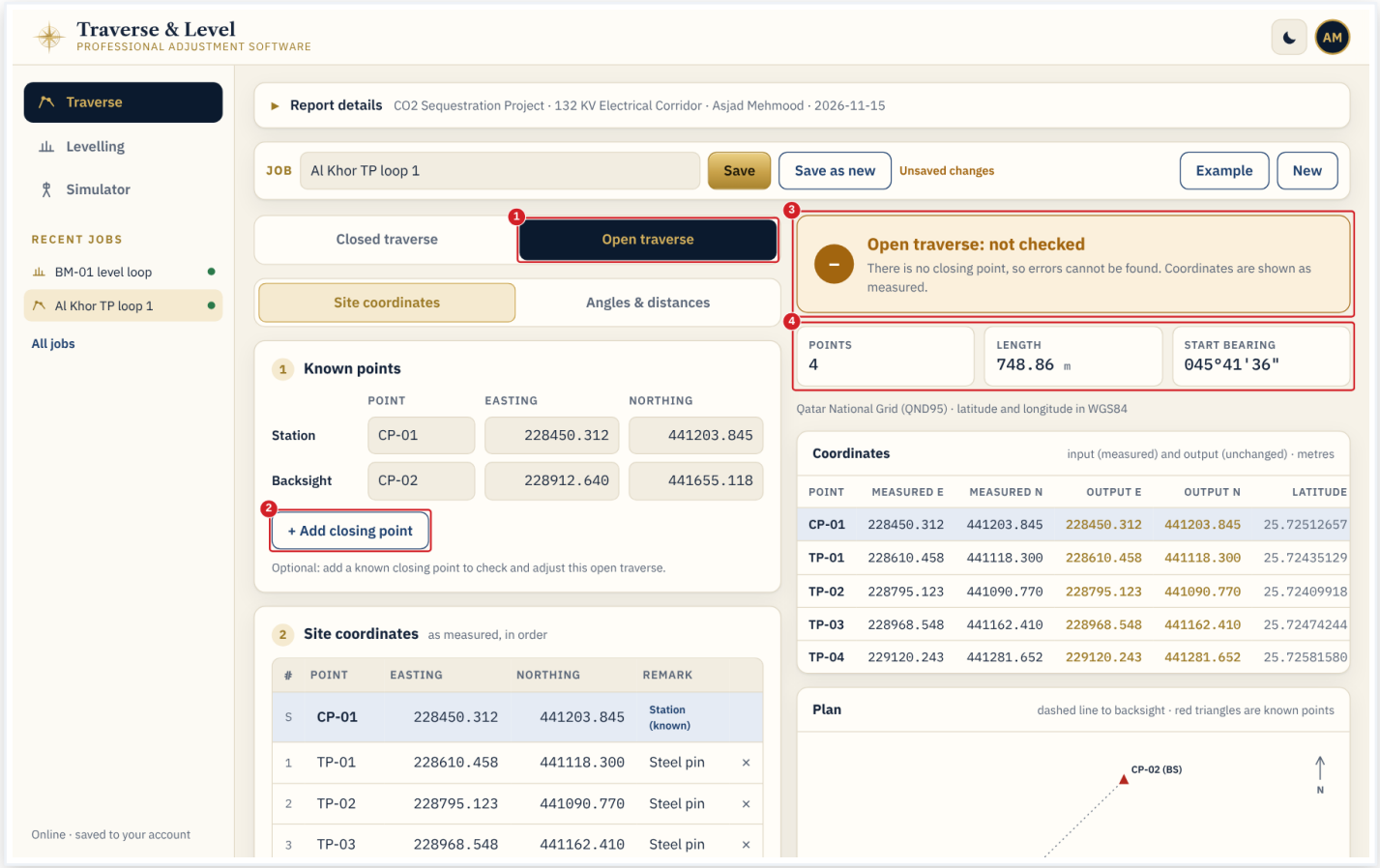


1 **Empty or invalid box**
A box with a red outline is missing or is not a number.

2 **Status list**
Lists exactly what to fix, one line each. The result appears when the list is empty.

TIP Typical messages: enter known Easting and Northing; row N is missing a number; backsight has the same coordinates as the station; precision must be positive.

Open traverse: as measured



1 Open traverse
Select it to run a traverse that does not end on a known point.

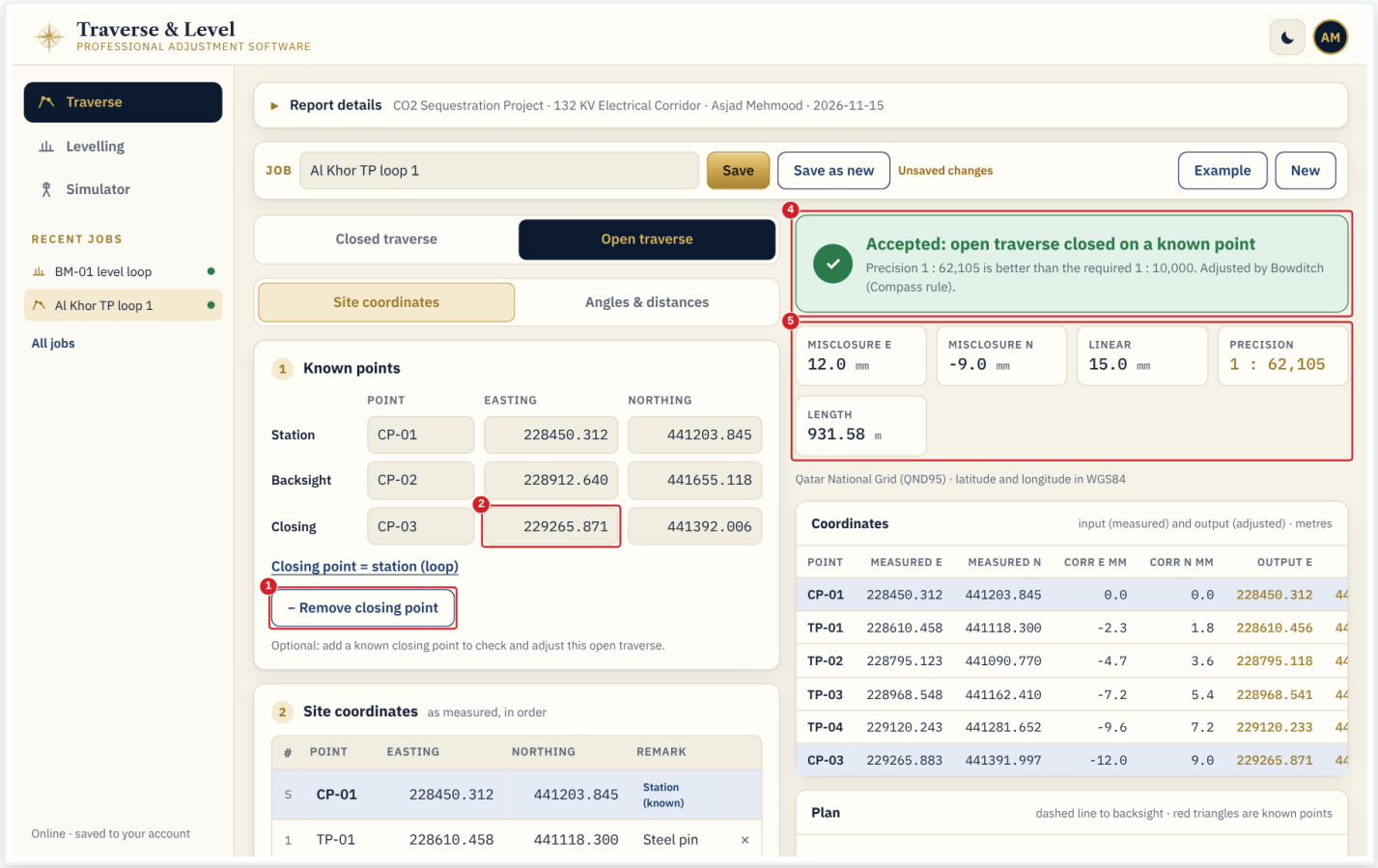
2 Add closing point
New button. It is optional and is explained on the next slide.

3 Not checked banner
Without a closing point errors cannot be found, so coordinates are shown exactly as measured.

4 Summary tiles
Number of points, length and the starting bearing.

TIP Choose Example while Open traverse is selected to load an open sample.

New: add a closing point



1 + Add closing point
Press it under Known points. The button then reads Remove closing point.

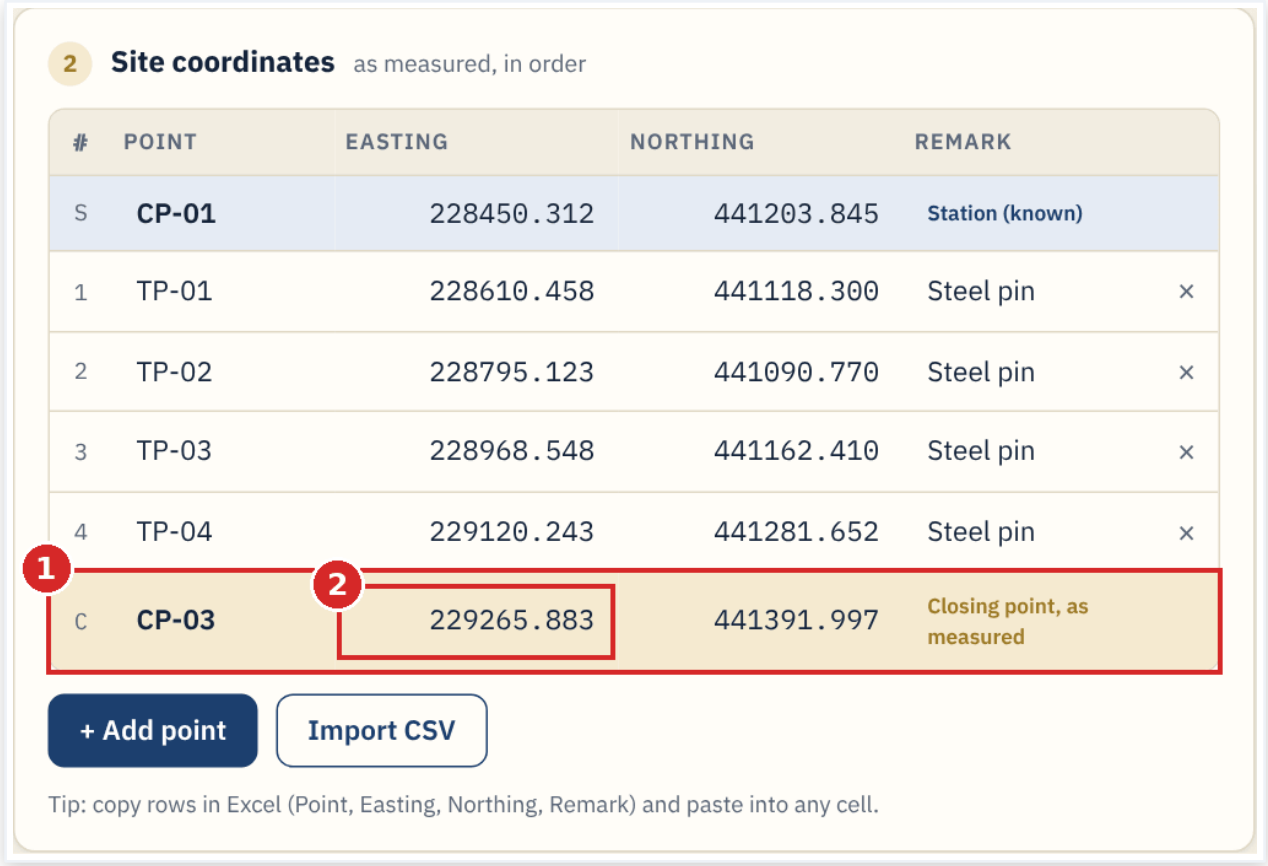
2 Closing point known coordinates
Type the name, Easting and Northing of the known point you finish on.

3 Adjustment card
Appears now: choose Bowditch, Transit or Equal and the required precision.

4 Status banner
Reads "Accepted: open traverse closed on a known point" or Rejected.

5 Misclosure tiles
Misclosure E and N, linear misclosure, precision and length.

Enter the measured closing point

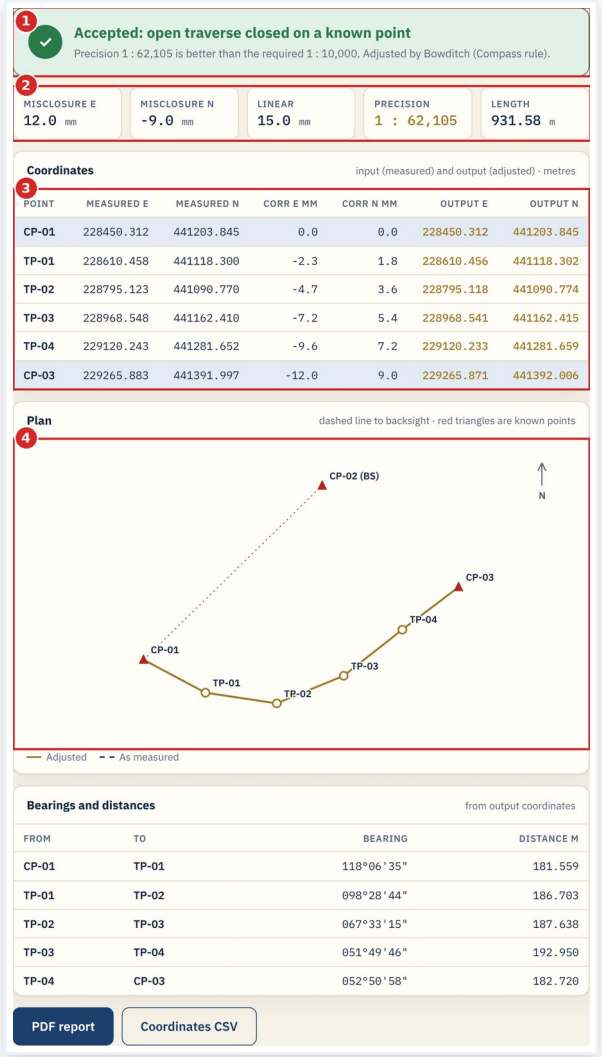


1. **Row C appears**
   A new row at the bottom of Site coordinates, tagged "Closing point, as measured".

2. **Measured Easting and Northing**
   Type what you observed on site for the closing point. The known values stay in Known points.

NOTE Both the known and the measured closing coordinates are needed. The status shows what is missing until both are complete.

Open traverse result



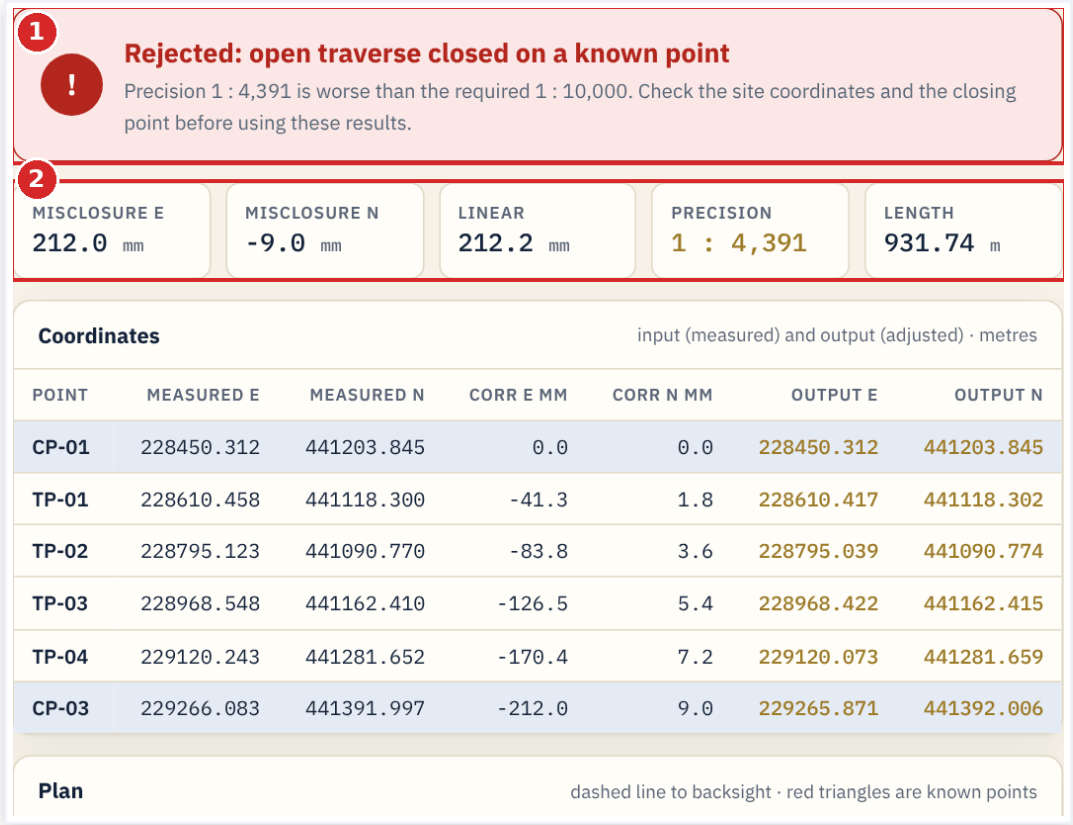
1 Accepted banner
Precision 1 : 62,105 is better than the required 1 : 10,000, adjusted by Bowditch.

2 Misclosure tiles
12.0 mm East and -9.0 mm North, linear 15.0 mm, over 931.58 m.

3 Coordinates table
Corrections grow along the traverse. The closing point ends on its known coordinates.

4 Plan sketch
Dashed line shows as measured and the gold line adjusted. The red triangle at the end is the known closing point.

Rejected, or remove the closing point

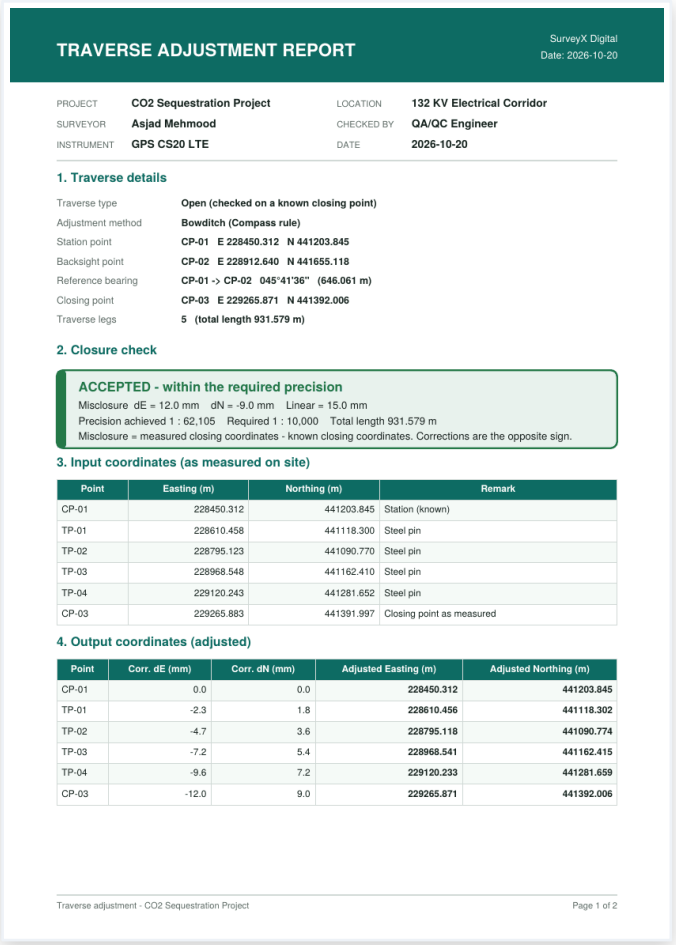


1 **Rejected: open traverse closed on a known point**
The misclosure is too large for the required precision. Check the closing coordinates and re-observe if needed.

2 **Remove closing point**
Press the button again to go back to the unchecked open traverse. Your typed values are kept.

NEW Closed traverse and open traverse without a closing point behave exactly as before.

PDF report and CSV export



TRAVERSE ADJUSTMENT REPORT

SurveyX Digital
Date: 2026-10-20

PROJECT	CO2 Sequestration Project	LOCATION	132 KV Electrical Corridor
SURVEYOR	Asjad Mehmood	CHECKED BY	QA/QC Engineer
INSTRUMENT	GPS CS20 LTE	DATE	2026-10-20

1. Traverse details

Traverse type	Open (checked on a known closing point)
Adjustment method	Bowditch (Compass rule)
Station point	CP-01 E 228450.312 N 441203.845
Backsight point	CP-02 E 228912.640 N 441655.118
Reference bearing	CP-01 -> CP-02 045°41'36" (646.061 m)
Closing point	CP-03 E 229265.871 N 441392.006
Traverse legs	5 (total length 931.579 m)

2. Closure check

ACCEPTED - within the required precision
Misclosure dE = 12.0 mm dN = -9.0 mm Linear = 15.0 mm
Precision achieved 1 : 62,105 Required 1 : 10,000 Total length 931.579 m
Misclosure = measured closing coordinates - known closing coordinates. Corrections are the opposite sign.

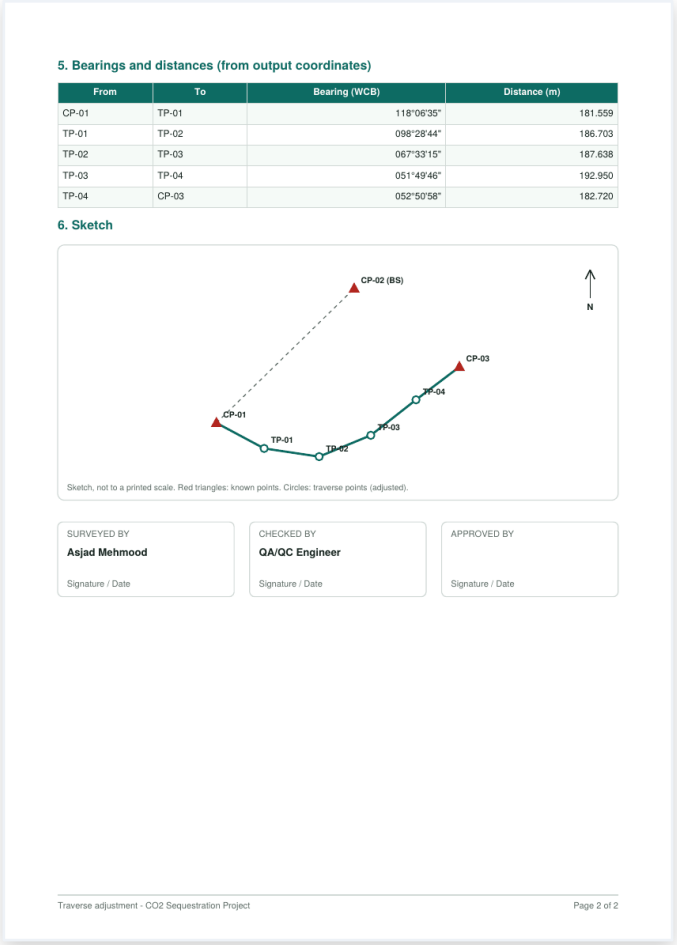
3. Input coordinates (as measured on site)

Point	Easting (m)	Northing (m)	Remark
CP-01	228450.312	441203.845	Station (known)
TP-01	228610.458	441118.300	Steel pin
TP-02	228795.123	441090.770	Steel pin
TP-03	228968.548	441162.410	Steel pin
TP-04	229120.243	441281.652	Steel pin
CP-03	229265.883	441391.997	Closing point as measured

4. Output coordinates (adjusted)

Point	Corr. dE (mm)	Corr. dN (mm)	Adjusted Easting (m)	Adjusted Northing (m)
CP-01	0.0	0.0	228450.312	441203.845
TP-01	-2.3	1.8	228610.456	441118.302
TP-02	-4.7	3.6	228795.118	441090.774
TP-03	-7.2	5.4	228968.541	441162.415
TP-04	-9.6	7.2	229120.233	441281.659
CP-03	-12.0	9.0	229265.871	441392.006

Traverse adjustment - CO2 Sequestration Project Page 1 of 2



5. Bearings and distances (from output coordinates)

From	To	Bearing (WCB)	Distance (m)
CP-01	TP-01	118°06'35"	181.559
TP-01	TP-02	098°28'44"	186.703
TP-02	TP-03	067°33'15"	187.638
TP-03	TP-04	051°49'46"	192.950
TP-04	CP-03	052°50'58"	182.720

6. Sketch

Sketch, not to a printed scale. Red triangles: known points. Circles: traverse points (adjusted).

SURVEYED BY	CHECKED BY	APPROVED BY
Asjad Mehmood	QA/QC Engineer	
Signature / Date	Signature / Date	Signature / Date

Traverse adjustment - CO2 Sequestration Project Page 2 of 2

PDF report

Press PDF report under the results. It contains: 1 Traverse details, 2 Closure check, 3 Input coordinates, 4 Output coordinates, 5 Bearings and distances, 6 Latitude and longitude (Qatar National Grid), 7 Sketch.

Type line in the report

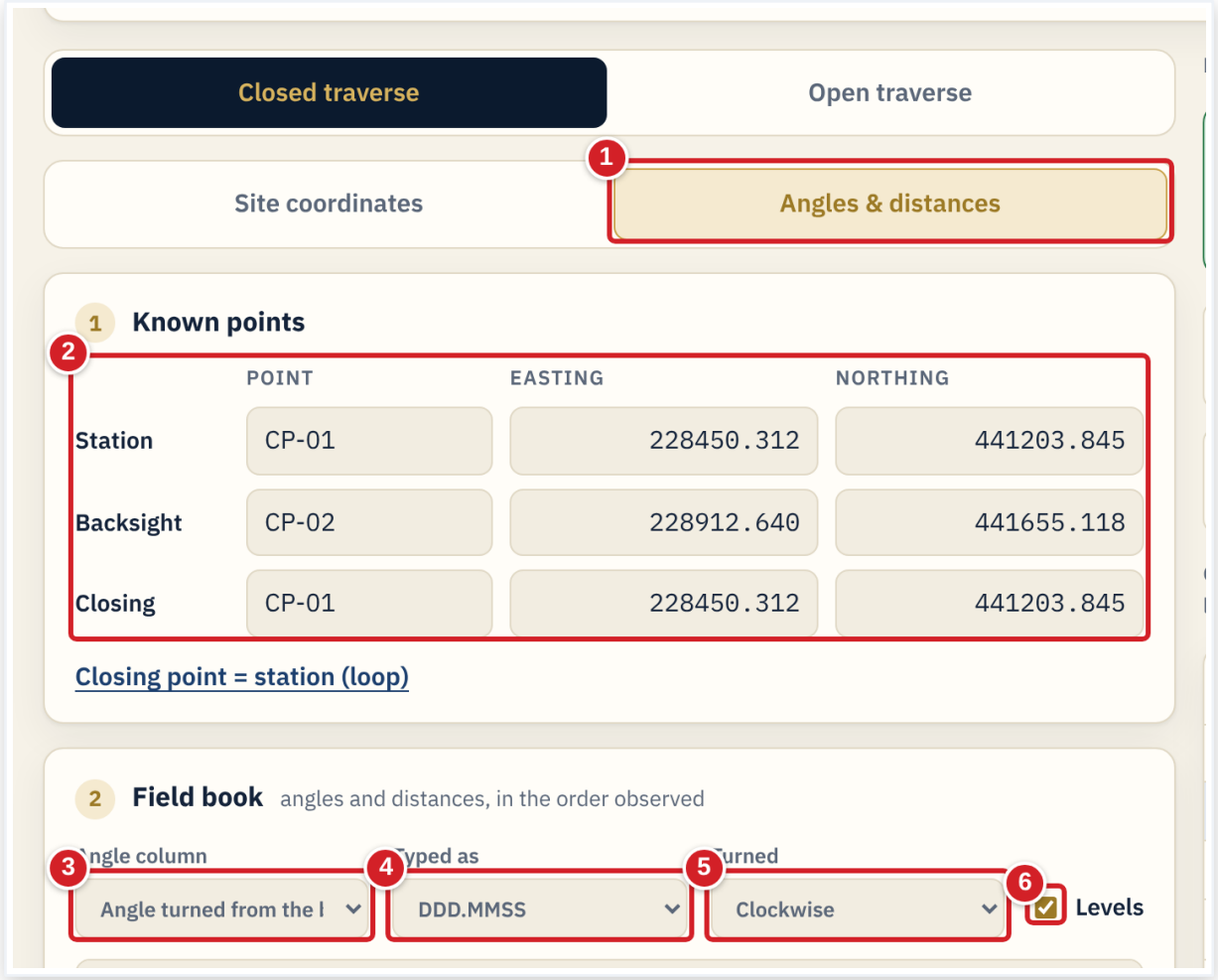
Reads Closed, Open (checked on a known closing point) or Open (no closing check).

Coordinates CSV

Press Coordinates CSV for Point, Measured E and N, Corr dE and dN, Output E and N, Latitude and Longitude, Remark.

TIP The PDF uses your Report details (project, location, surveyor, checker, instrument, date). Fill them in first.

Angles & distances: the field book



1 Angles & distances
New switch under the traverse type. Enter what the instrument recorded instead of coordinates.

2 Known points
Station, backsight and closing point, as before. The backsight gives the starting direction.

3 Angle column
Angle turned from the backsight at each set-up, or a whole-circle bearing for each leg.

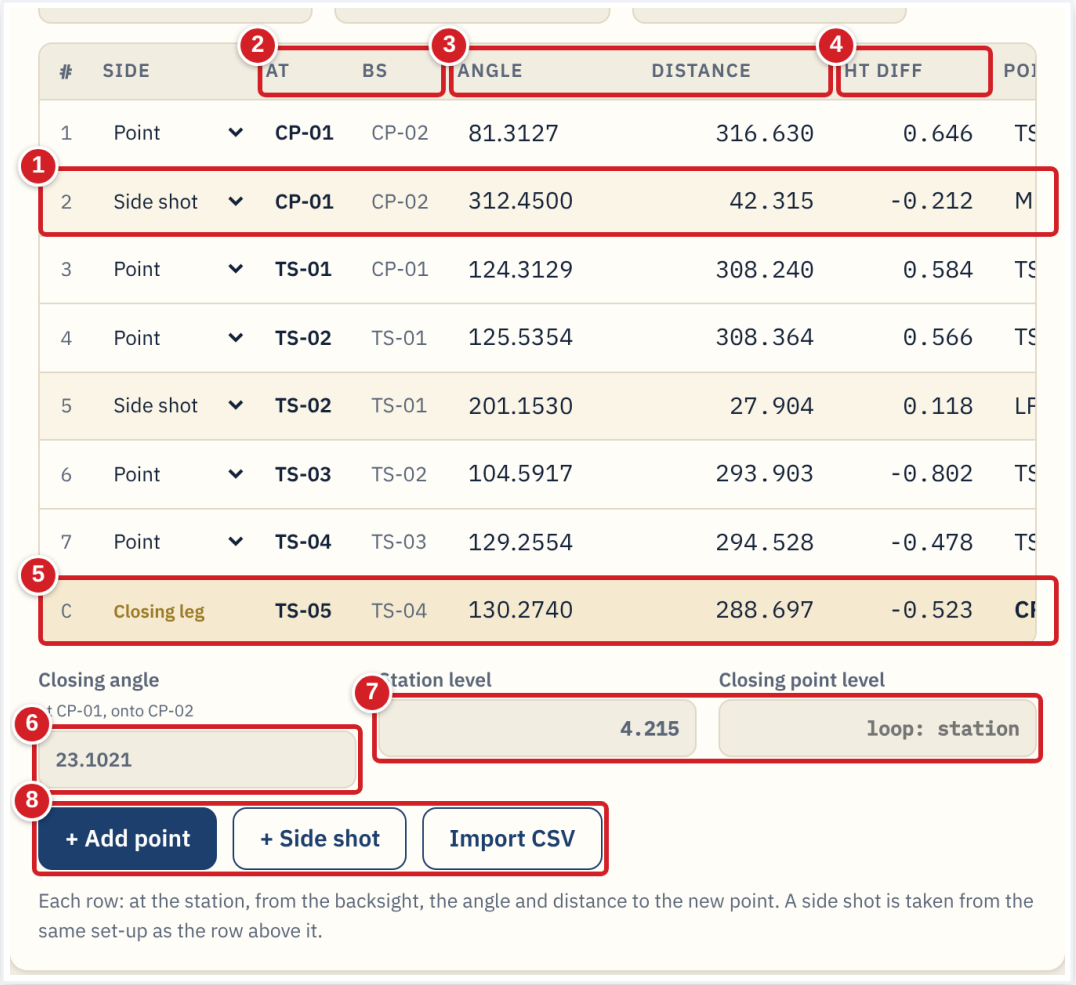
4 Typed as
DDD.MMSS (81.3127 is 81°31'27"), decimal degrees or gons.

5 Turned
Clockwise or anticlockwise from the backsight.

6 Levels
Tick to add a height difference column and carry levels through the traverse.

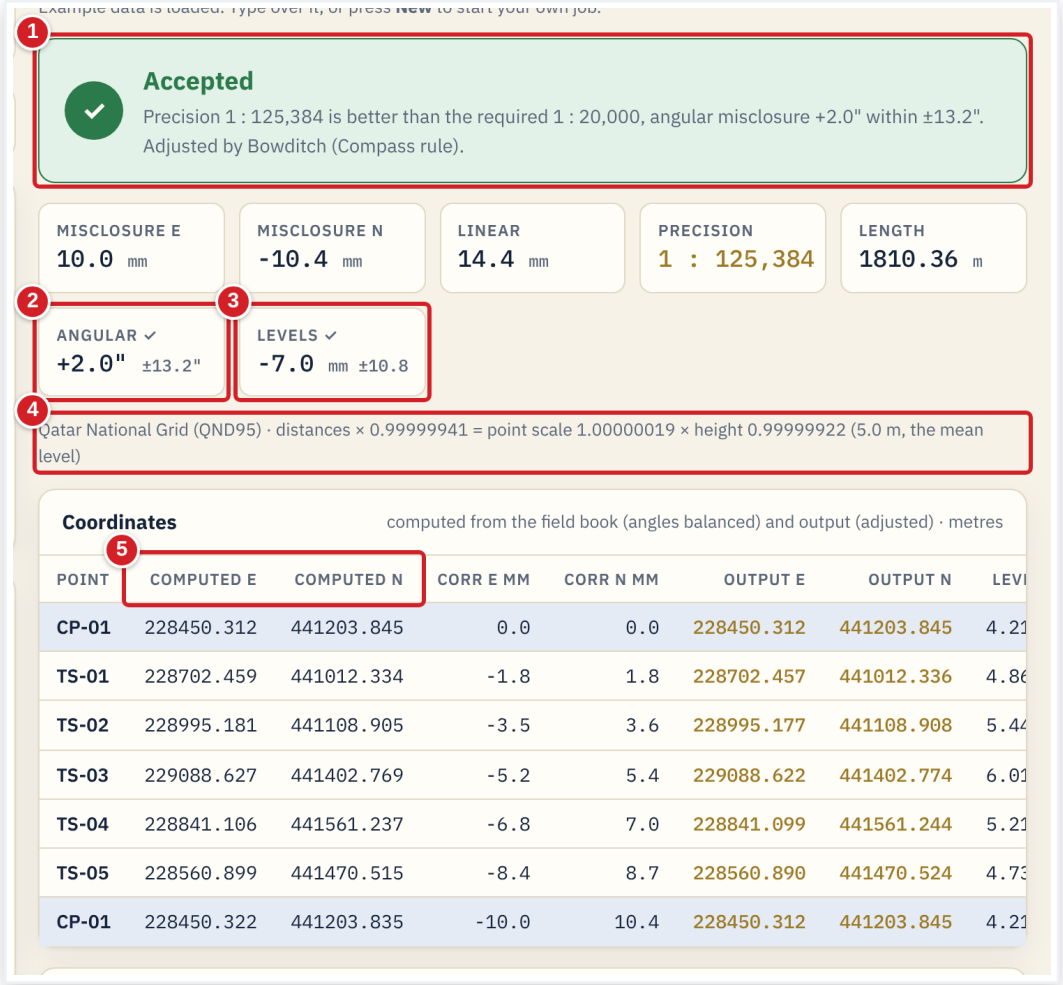
TIP Press Example with Angles & distances selected to load a levelled loop with two side shots.

Field book rows, side shots and closing leg



1. **Side shot**
   Set a row to Side shot for a detail point. It uses the set-up of the row above and does not carry the traverse on.
2. **At and BS**
   Filled in for you: each set-up and its backsight follow from the rows above.
3. **Angle and distance**
   Angle from the backsight to the new point, and the horizontal distance in metres.
4. **Ht diff**
   Height difference to the point. Shown when Levels is ticked.
5. **Row C: closing leg**
   Last angle and distance onto the closing point, shown when the traverse closes on a known point.
6. **Closing angle**
   Optional angle at the closing point onto its reference (the backsight for a loop). It gives the angular check.
7. **Station and closing levels**
   Known levels at the start and at the closing point. A loop closes on the station level.
8. **Add point, Side shot, Import CSV**
   Add rows, or import Point, Angle, Distance, Ht diff, Remark, Side from a file.

Reading the field book result



1 Status banner
Accepted needs the precision, the angular misclosure and the level misclosure all within their limits.

2 Angular tile
Angular misclosure against the allowed K" x sqrt(n). It is shared equally between the angles.

3 Levels tile
Level misclosure against the allowed C mm x sqrt(km). It is distributed by distance.

4 Scale factor line
The factor applied to the measured distances (see Coordinate system).

5 Computed E and N
Coordinates from the balanced angles and distances. Output E and N are the adjusted values.

NOTE A rejected angular check usually means a mistyped angle or the wrong Turned direction. Check those first.

Angles, side shots and the plan

Angles clockwise from the backsight · balanced

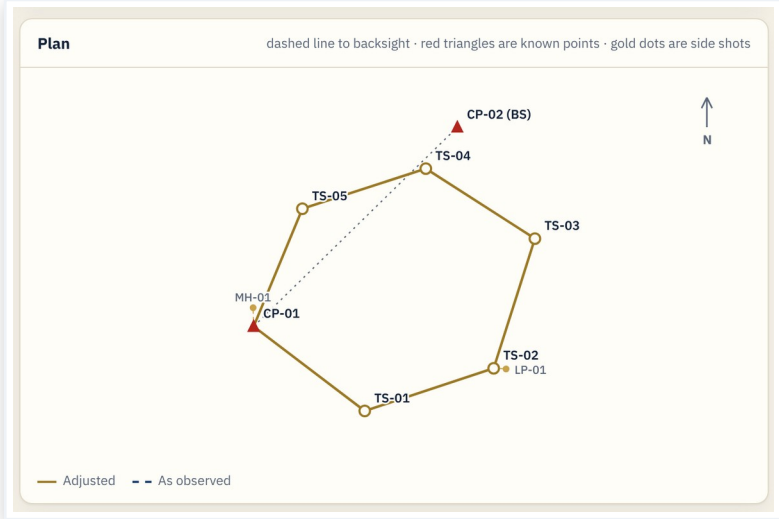
AT	BACKSIGHT	FORESIGHT	OBSERVED	CORRECTION	ADJUSTED
CP-01	CP-02	TS-01	081°31'27.0"	-0.29"	081°31'26.7"
TS-01	CP-01	TS-02	124°31'29.0"	-0.29"	124°31'28.7"
TS-02	TS-01	TS-03	125°53'54.0"	-0.29"	125°53'53.7"
TS-03	TS-02	TS-04	104°59'17.0"	-0.29"	104°59'16.7"
TS-04	TS-03	TS-05	129°25'54.0"	-0.29"	129°25'53.7"
TS-05	TS-04	CP-01	130°27'40.0"	-0.29"	130°27'39.7"
CP-01	TS-05	CP-02	023°10'21.0"	-0.29"	023°10'20.7"

Side shots from the adjusted stations

POINT	FROM	BEARING	DISTANCE M	EASTING	NORTHING	LEVEL	LATITUDE
MH-01	CP-01	358°26'36"	42.315	228449.162	441246.144	4.003	25.72550841
LP-01	TS-02	093°00'00"	27.904	229023.043	441107.448	5.565	25.72424525

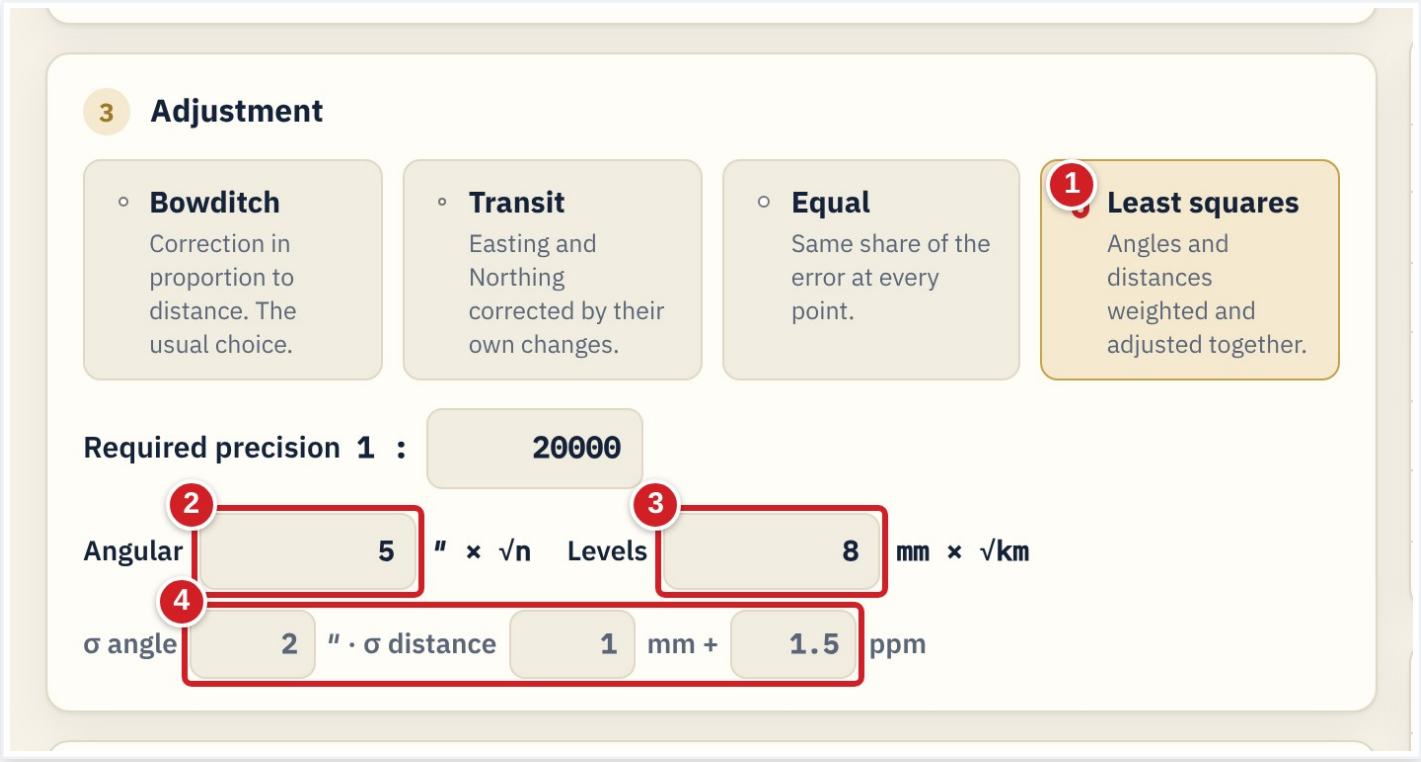
1 Angles
Each observed angle, its correction and the adjusted angle, clockwise from the backsight.

2 Side shots
Bearing, distance, coordinates, level, latitude and longitude, from the adjusted stations.



Plan Side shots are gold dots, joined to their set-up by a dashed line.

Least squares adjustment



1 Least squares
Fourth method, in Angles & distances mode. Angles and distances are adjusted together, each by its weight.

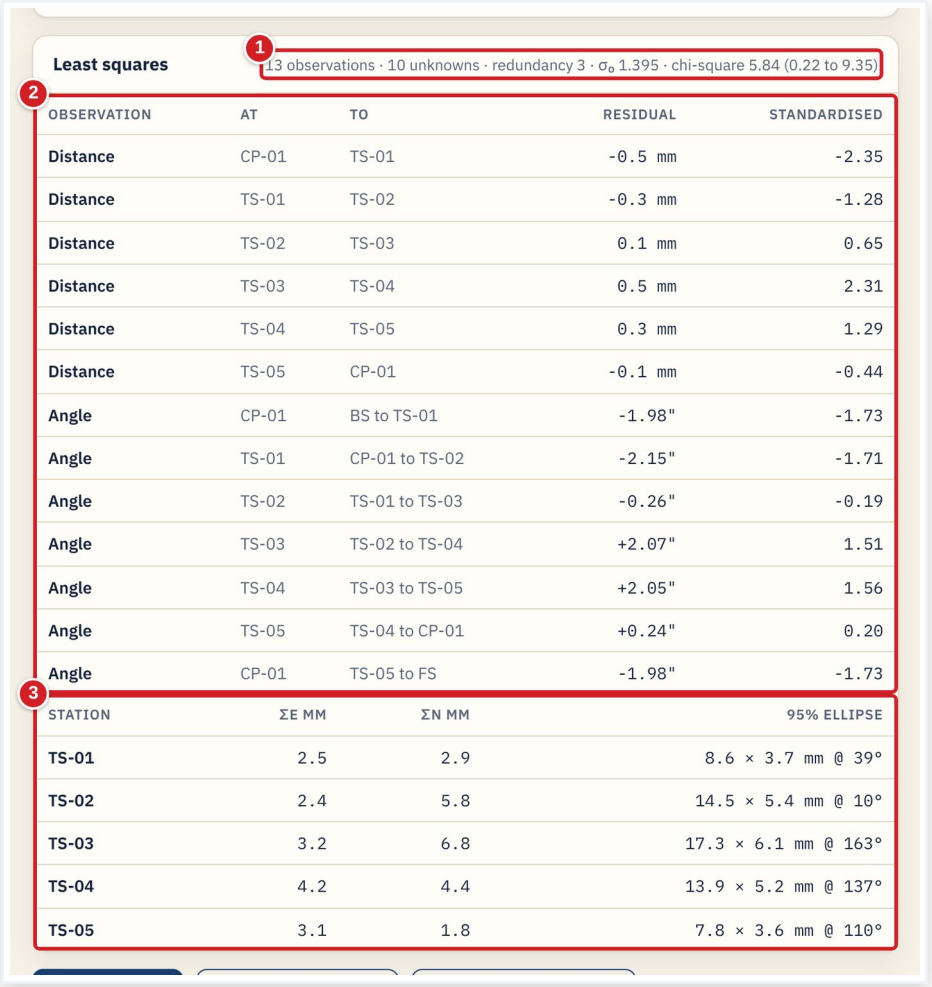
2 Angular limit
K seconds x sqrt(n), the allowed angular misclosure for n angles.

3 Levels limit
C mm x sqrt(km), the allowed level misclosure.

4 Standard errors
Sigma angle in seconds and sigma distance as mm + ppm, from your instrument. They set the weights.

TIP Least squares gives the most probable coordinates and a test of the whole traverse. Bowditch stays the usual choice for a simple loop.

Least squares results



Least squares — 13 observations · 10 unknowns · redundancy 3 · σ_0 1.395 · chi-square 5.84 (0.22 to 9.35)

OBSERVATION	AT	TO	RESIDUAL	STANDARDISED
Distance	CP-01	TS-01	-0.5 mm	-2.35
Distance	TS-01	TS-02	-0.3 mm	-1.28
Distance	TS-02	TS-03	0.1 mm	0.65
Distance	TS-03	TS-04	0.5 mm	2.31
Distance	TS-04	TS-05	0.3 mm	1.29
Distance	TS-05	CP-01	-0.1 mm	-0.44
Angle	CP-01	BS to TS-01	-1.98"	-1.73
Angle	TS-01	CP-01 to TS-02	-2.15"	-1.71
Angle	TS-02	TS-01 to TS-03	-0.26"	-0.19
Angle	TS-03	TS-02 to TS-04	+2.07"	1.51
Angle	TS-04	TS-03 to TS-05	+2.05"	1.56
Angle	TS-05	TS-04 to CP-01	+0.24"	0.20
Angle	CP-01	TS-05 to FS	-1.98"	-1.73

STATION	ΣE MM	ΣN MM	95% ELLIPSE
TS-01	2.5	2.9	8.6 × 3.7 mm @ 39°
TS-02	2.4	5.8	14.5 × 5.4 mm @ 10°
TS-03	3.2	6.8	17.3 × 6.1 mm @ 163°
TS-04	4.2	4.4	13.9 × 5.2 mm @ 137°
TS-05	3.1	1.8	7.8 × 3.6 mm @ 110°

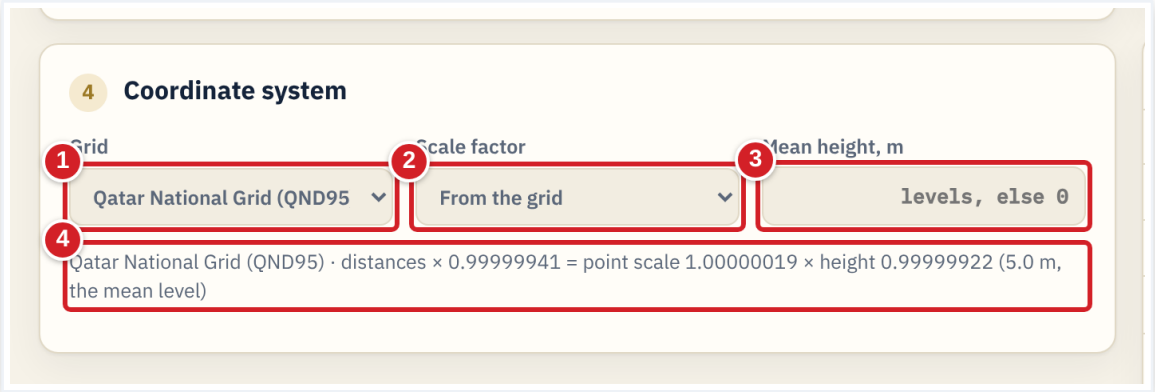
1 Summary line
Observations, unknowns, redundancy, sigma0 (standard error of unit weight) and the chi-square test with its limits.

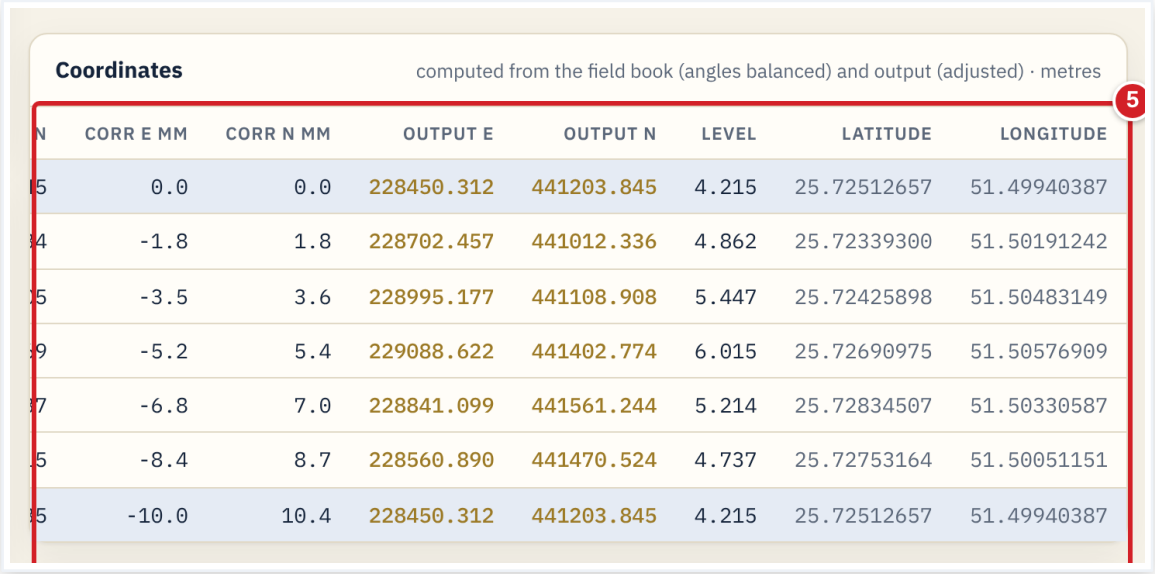
2 Residuals
The correction to each distance and angle, and the standardised residual. Beyond 3 it is marked: look for a blunder there.

3 Error ellipses
Standard errors of each adjusted station and its 95% error ellipse: semi-axes and bearing.

NOTE Accepted also needs chi-square under its upper limit. Under the lower limit is only a warning: the sigmas are set too large.

Coordinate system: Qatar National Grid





N	CORR E MM	CORR N MM	OUTPUT E	OUTPUT N	LEVEL	LATITUDE	LONGITUDE
15	0.0	0.0	228450.312	441203.845	4.215	25.72512657	51.49940387
14	-1.8	1.8	228702.457	441012.336	4.862	25.72339300	51.50191242
15	-3.5	3.6	228995.177	441108.908	5.447	25.72425898	51.50483149
19	-5.2	5.4	229088.622	441402.774	6.015	25.72690975	51.50576909
17	-6.8	7.0	228841.099	441561.244	5.214	25.72834507	51.50330587
15	-8.4	8.7	228560.890	441470.524	4.737	25.72753164	51.50051151
15	-10.0	10.4	228450.312	441203.845	4.215	25.72512657	51.49940387

1 Grid
Qatar National Grid (QND95) or Local grid. Card 4 on the Traverse screen, in both input modes.

2 Scale factor
From the grid: point scale x height factor, worked out for the job. Typed: your own combined factor.

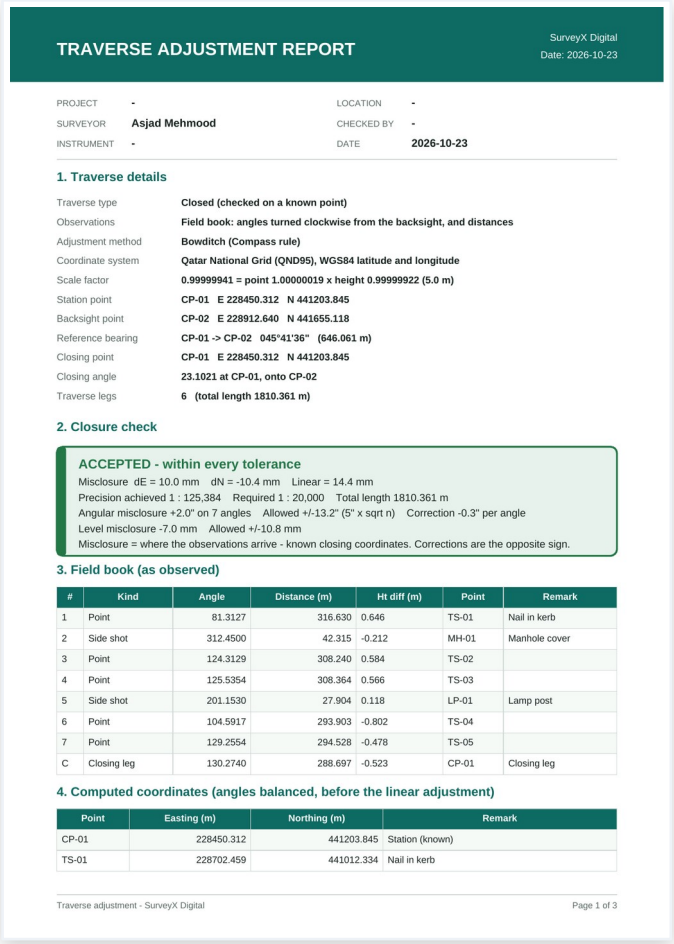
3 Mean height
Height for the height factor. Blank uses the levels, or 0.

4 Factor line
The factor applied to the measured distances, here 0.99999941.

5 Latitude and longitude
WGS84 values for every point and side shot, also in the PDF, the CSV and Google Earth.

NOTE Same formulas as Excel to KML: International 1924, k0 0.99999, QND95 datum shift. A point outside Qatar gives a warning.

PDF report, CSV and Google Earth



TRAVERSE ADJUSTMENT REPORT

SurveyX Digital
Date: 2026-10-23

PROJECT	-	LOCATION	-
SURVEYOR	Asjad Mehmood	CHECKED BY	-
INSTRUMENT	-	DATE	2026-10-23

1. Traverse details

Traverse type	Closed (checked on a known point)
Observations	Field book: angles turned clockwise from the backsight, and distances
Adjustment method	Bowditch (Compass rule)
Coordinate system	Qatar National Grid (QND95), WGS84 latitude and longitude
Scale factor	0.99999941 = point 1.00000019 x height 0.99999922 (5.0 m)
Station point	CP-01 E 228450.312 N 441203.845
Backsight point	CP-02 E 228912.640 N 441655.118
Reference bearing	CP-01 -> CP-02 045°41'36" (646.061 m)
Closing point	CP-01 E 228450.312 N 441203.845
Closing angle	23.1021 at CP-01, onto CP-02
Traverse legs	6 (total length 1810.361 m)

2. Closure check

ACCEPTED - within every tolerance
Misclosure dE = 10.0 mm dN = -10.4 mm Linear = 14.4 mm
Precision achieved 1 : 125,384 Required 1 : 20,000 Total length 1810.361 m
Angular misclosure +2.0" on 7 angles Allowed +/-13.2" (5" x sqrt n) Correction -0.3" per angle
Level misclosure -7.0 mm Allowed +/-10.8 mm
Misclosure = where the observations arrive - known closing coordinates. Corrections are the opposite sign.

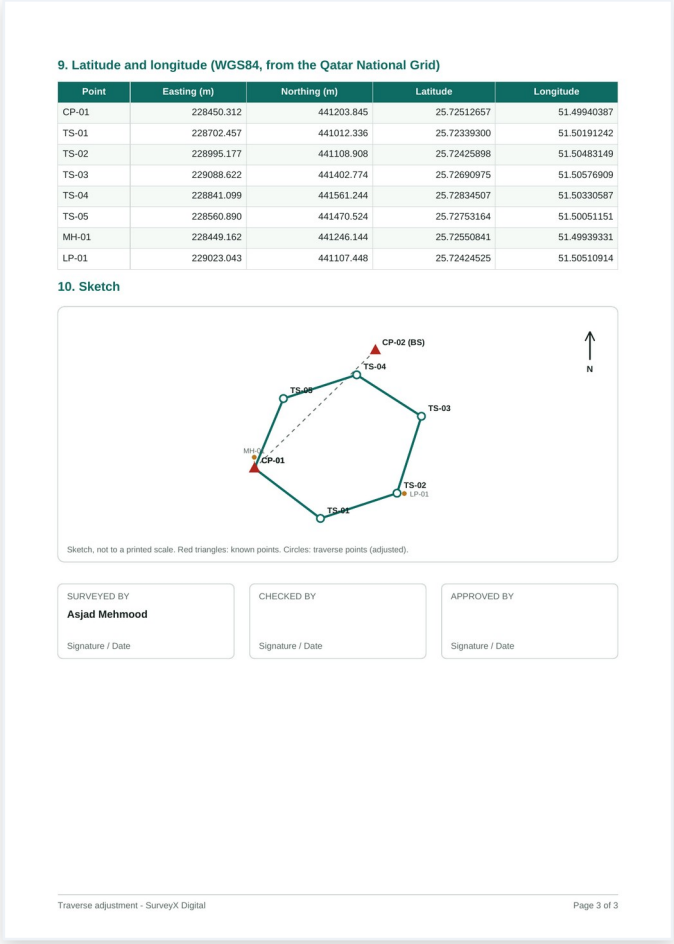
3. Field book (as observed)

#	Kind	Angle	Distance (m)	Ht diff (m)	Point	Remark
1	Point	81.3127	316.630	0.646	TS-01	Nail in kerb
2	Side shot	312.4500	42.315	-0.212	MH-01	Manhole cover
3	Point	124.3129	308.240	0.584	TS-02	
4	Point	125.5354	308.364	0.566	TS-03	
5	Side shot	201.1530	27.904	0.118	LP-01	Lamp post
6	Point	104.5917	293.903	-0.802	TS-04	
7	Point	129.2554	294.528	-0.478	TS-05	
C	Closing leg	130.2740	288.697	-0.523	CP-01	Closing leg

4. Computed coordinates (angles balanced, before the linear adjustment)

Point	Easting (m)	Northing (m)	Remark
CP-01	228450.312	441203.845	Station (known)
TS-01	228702.459	441012.334	Nail in kerb

Traverse adjustment - SurveyX Digital Page 1 of 3



9. Latitude and longitude (WGS84, from the Qatar National Grid)

Point	Easting (m)	Northing (m)	Latitude	Longitude
CP-01	228450.312	441203.845	25.72512657	51.49940387
TS-01	228702.457	441012.336	25.72339300	51.50191242
TS-02	228995.177	441108.908	25.72425898	51.50483149
TS-03	229088.622	441402.774	25.72690975	51.50576909
TS-04	228841.099	441561.244	25.72834507	51.50330587
TS-05	228560.890	441470.524	25.72753164	51.50051151
MH-01	228449.162	441246.144	25.72550841	51.49939331
LP-01	229023.043	441107.448	25.72424525	51.50510914

10. Sketch

Sketch, not to a printed scale. Red triangles: known points. Circles: traverse points (adjusted).

SURVEYED BY	CHECKED BY	APPROVED BY
Asjad Mehmood		
Signature / Date	Signature / Date	Signature / Date

Traverse adjustment - SurveyX Digital Page 3 of 3

PDF report

Adds Observations, Coordinate system and Scale factor lines, the field book, computed coordinates, angles, side shots, least squares, latitude and longitude, and the sketch.

Coordinates CSV

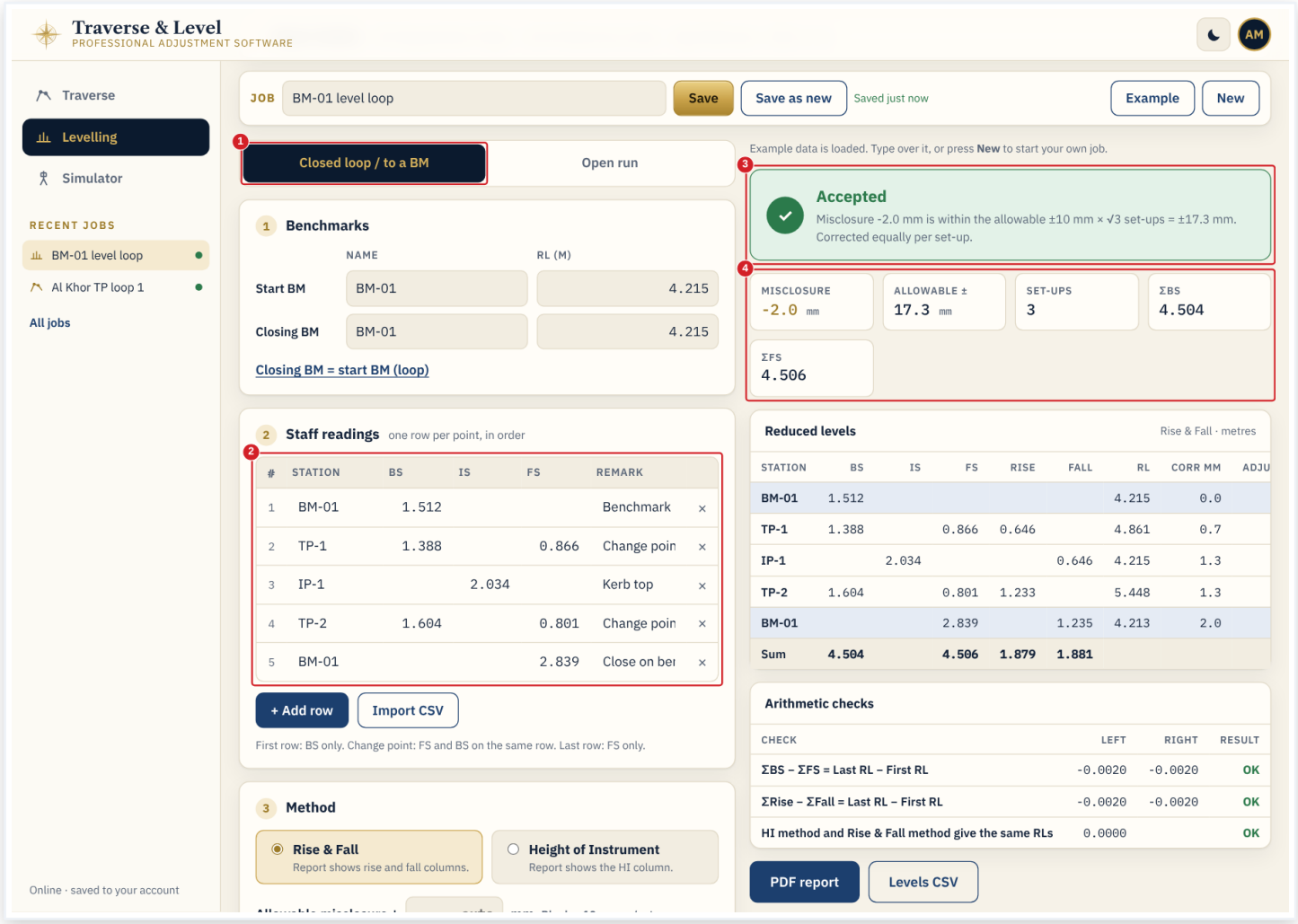
Adds Level, Latitude and Longitude columns and the side shots.

Google Earth (KML)

New button. Saves the traverse line, stations and side shots as a KML file for Google Earth. It needs Qatar National Grid.

TIP The closure check in the PDF lists the angular and level checks as well as the precision.

The Levelling screen



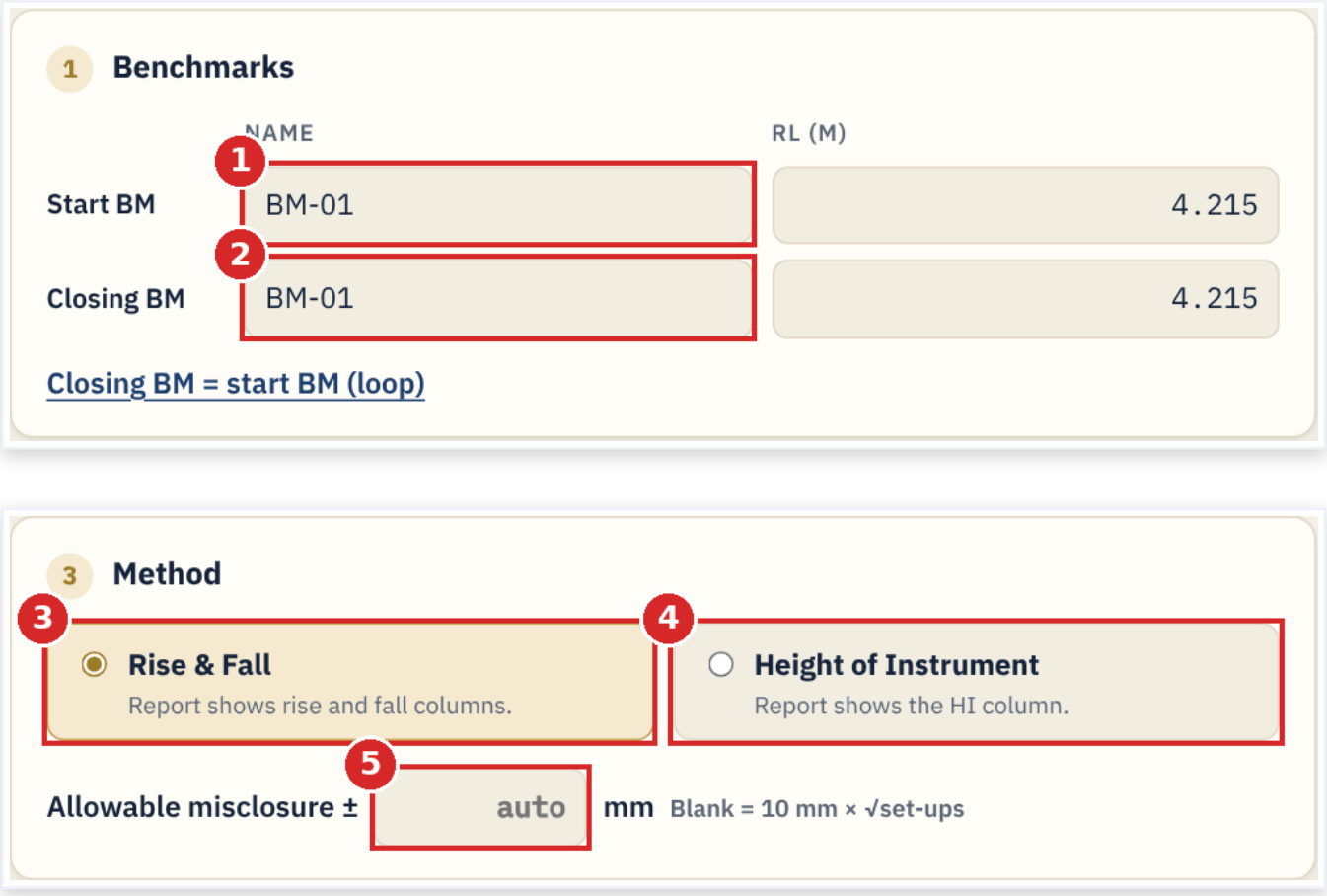
1 Run type
Closed loop / to a BM checks on a known benchmark. Open run is not checked.

2 Benchmarks and staff readings
Start BM with its RL, closing BM, then one row per staff reading.

3 Status banner
Accepted when the misclosure is within the allowable value, here -2.0 mm against 17.3 mm.

4 Summary tiles
Misclosure, allowable, number of set-ups, total BS and total FS.

Benchmarks and method



1. **Start BM**
   Name and known RL of the benchmark you start on.

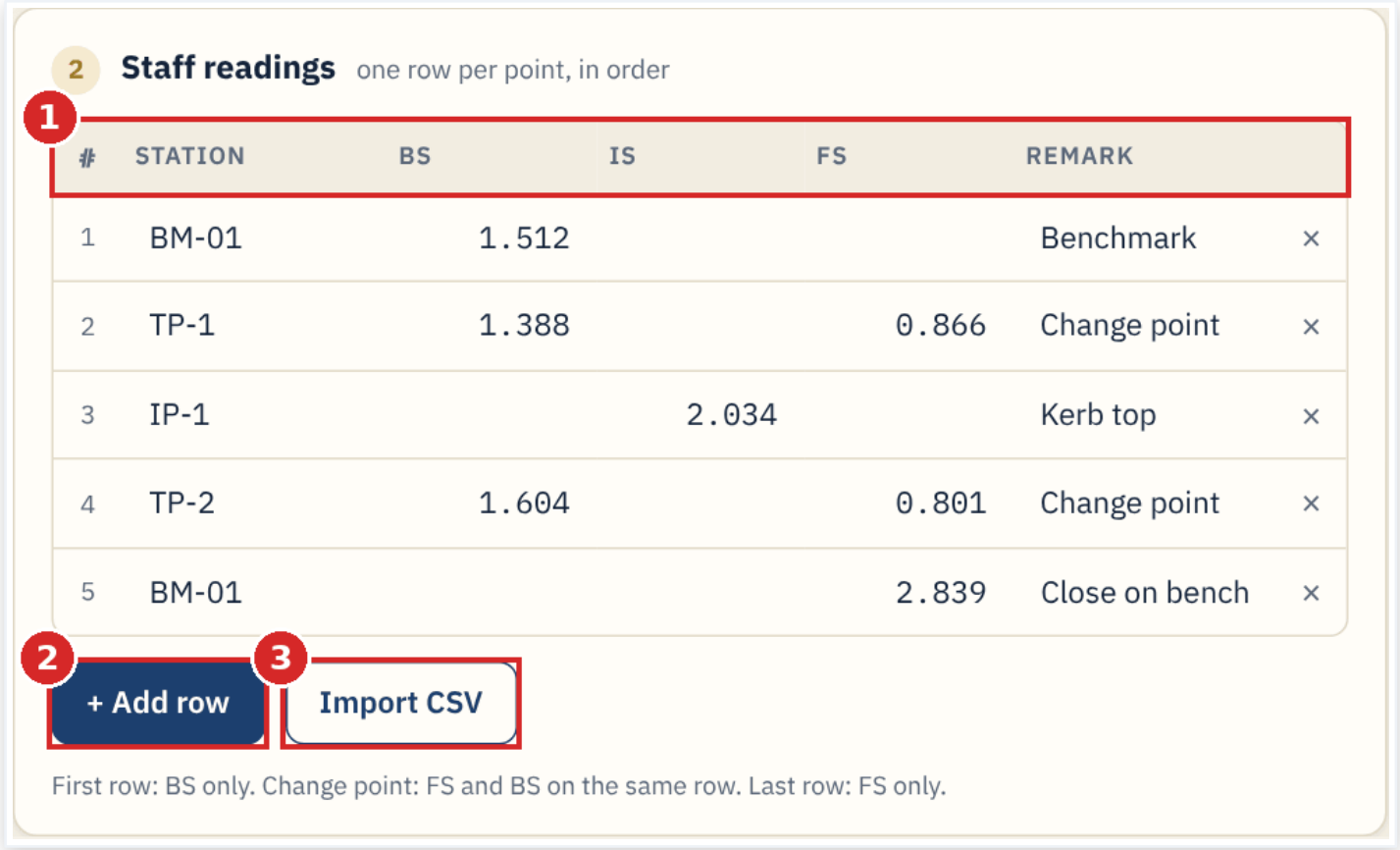
2. **Closing BM**
   Benchmark you finish on. For a loop press "Closing BM = start BM".

3. **Rise & Fall**
   Report shows rise and fall columns.

4. **Height of Instrument**
   Report shows the HI column. Both methods give the same levels.

5. **Allowable misclosure**
   Leave blank for 10 mm x sqrt(set-ups), or type your own value in mm.

Staff readings



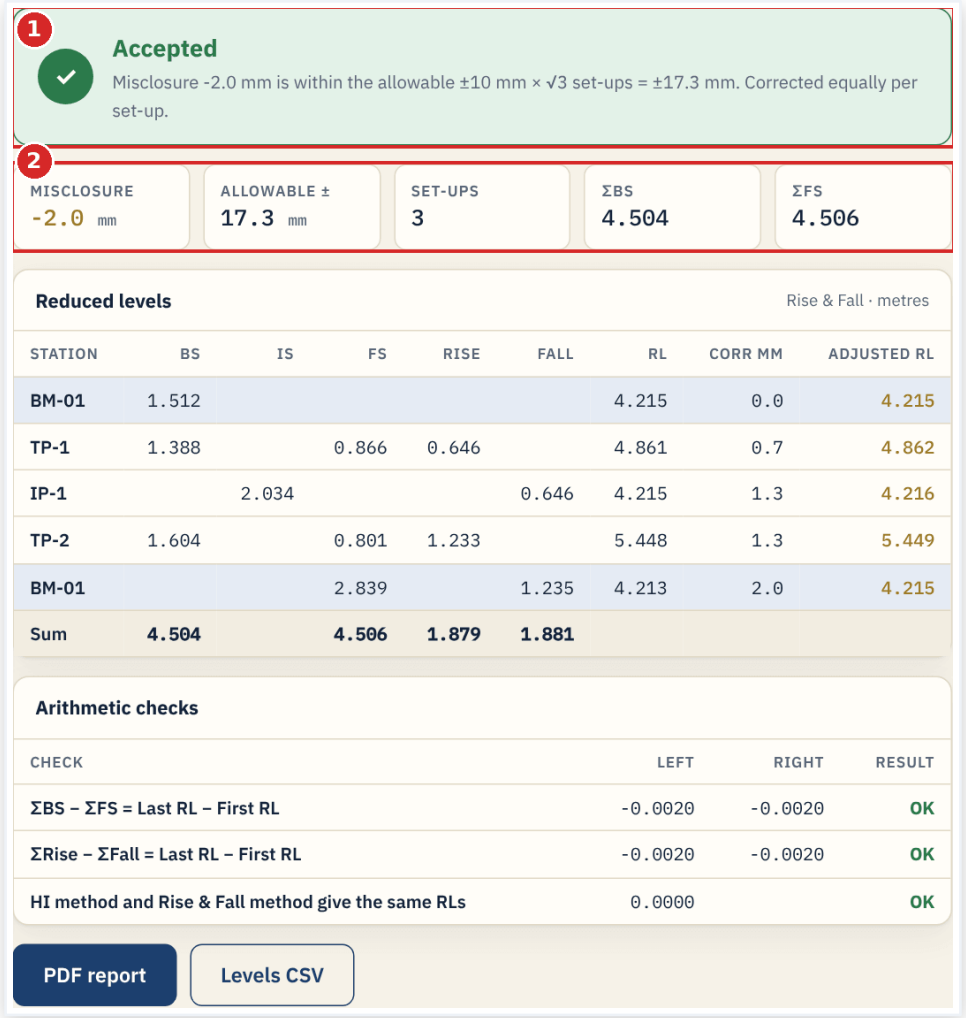
1. **Readings table**
   One row per reading: Station, BS, IS, FS, Remark.

2. **+ Add row**
   Adds an empty row.

3. **Import CSV**
   Loads Station, BS, IS, FS, Remark from a file.

TIP First row: BS only. Change point: FS and BS on the same row. Intermediate sight: IS alone. Last row: FS only.

Reading the levelling result



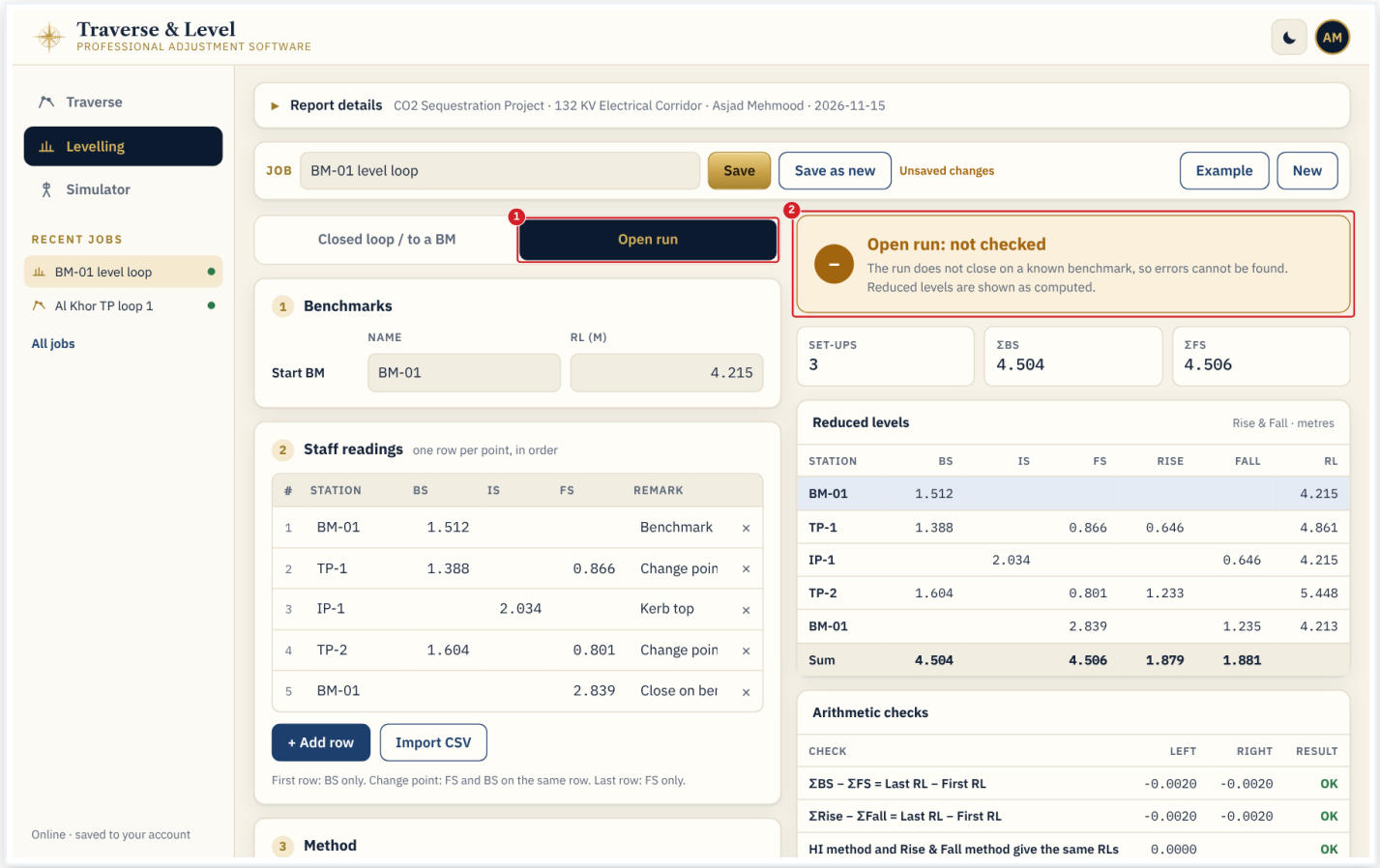
1. **Status and tiles**
   Accepted or Rejected, with the misclosure, allowable value, set-ups and sums of BS and FS.

2. **Reduced levels table**
   BS, IS, FS, Rise, Fall, RL, correction in mm and the adjusted RL. Correction is shared equally per set-up.

3. **Arithmetic checks**
   Sum BS - Sum FS and Sum Rise - Sum Fall must equal last RL - first RL. All checks show OK.

4. **PDF report and Levels CSV**
   Buttons at the bottom of the result column.

Open run

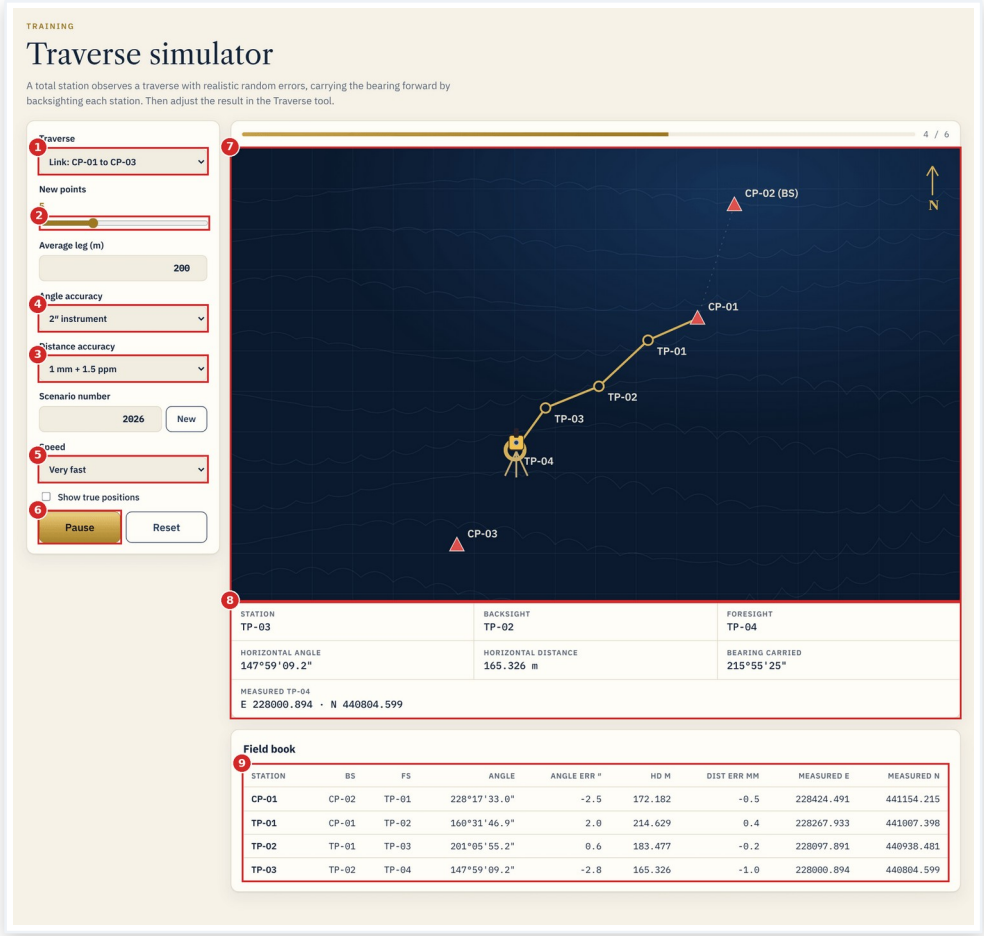


1 Open run
Select it when you do not close on a benchmark.

2 Not checked banner
Errors cannot be found. Reduced levels are shown as computed and no correction is applied.

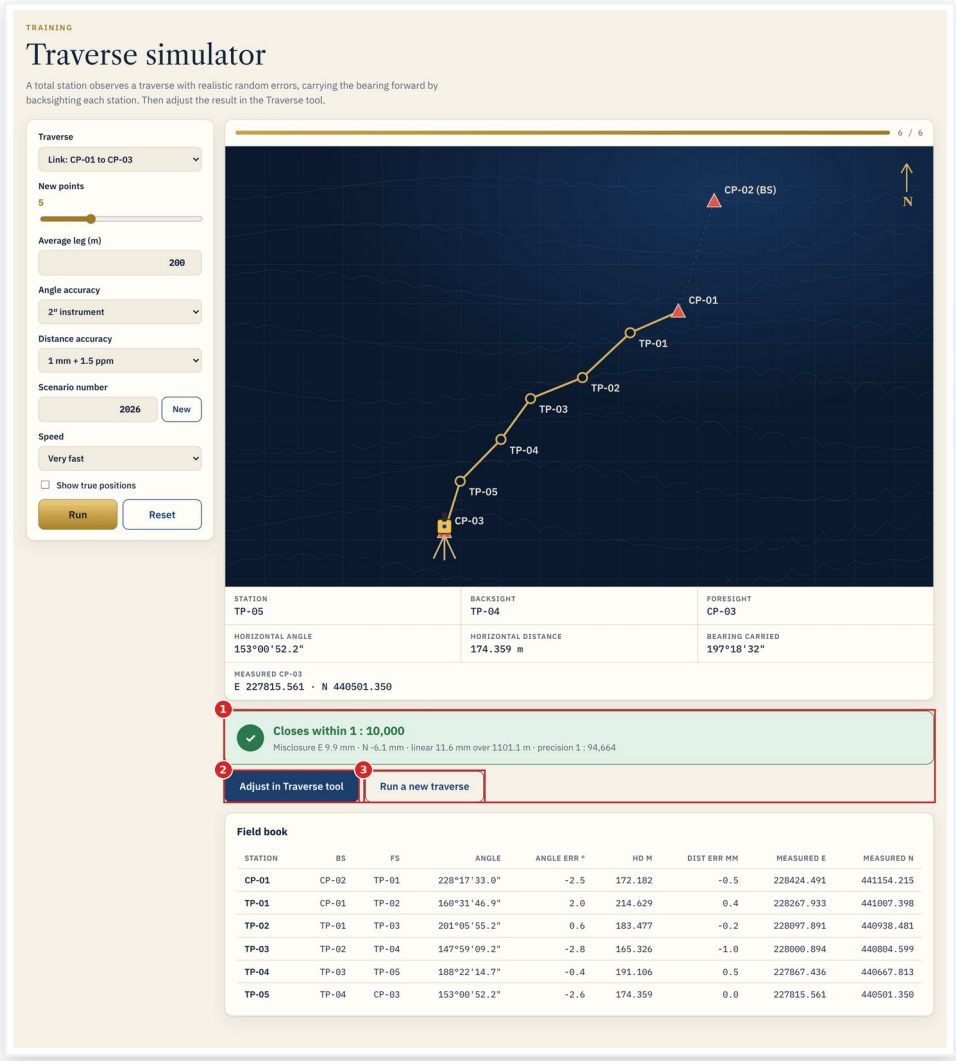
TIP The Closing BM boxes are hidden for an open run. Switch back to Closed loop to use them.

Traverse simulator



1. **Traverse** Link CP-01 to CP-03, or loop back.
2. **New points** Slider for the number of points.
3. **Distance accuracy** For example 1 mm + 1.5 ppm.
4. **Angle accuracy** 1 second up to a poor 30 second set-up.
5. **Speed** Slow to very fast.
6. **Run / Pause** Starts or pauses. Reset clears.
7. **Stage** Plan view with the moving instrument.
8. **Current reading** Station, backsight, angle, distance.
9. **Field book** Each reading with its errors.

Finish and adjust the simulated traverse



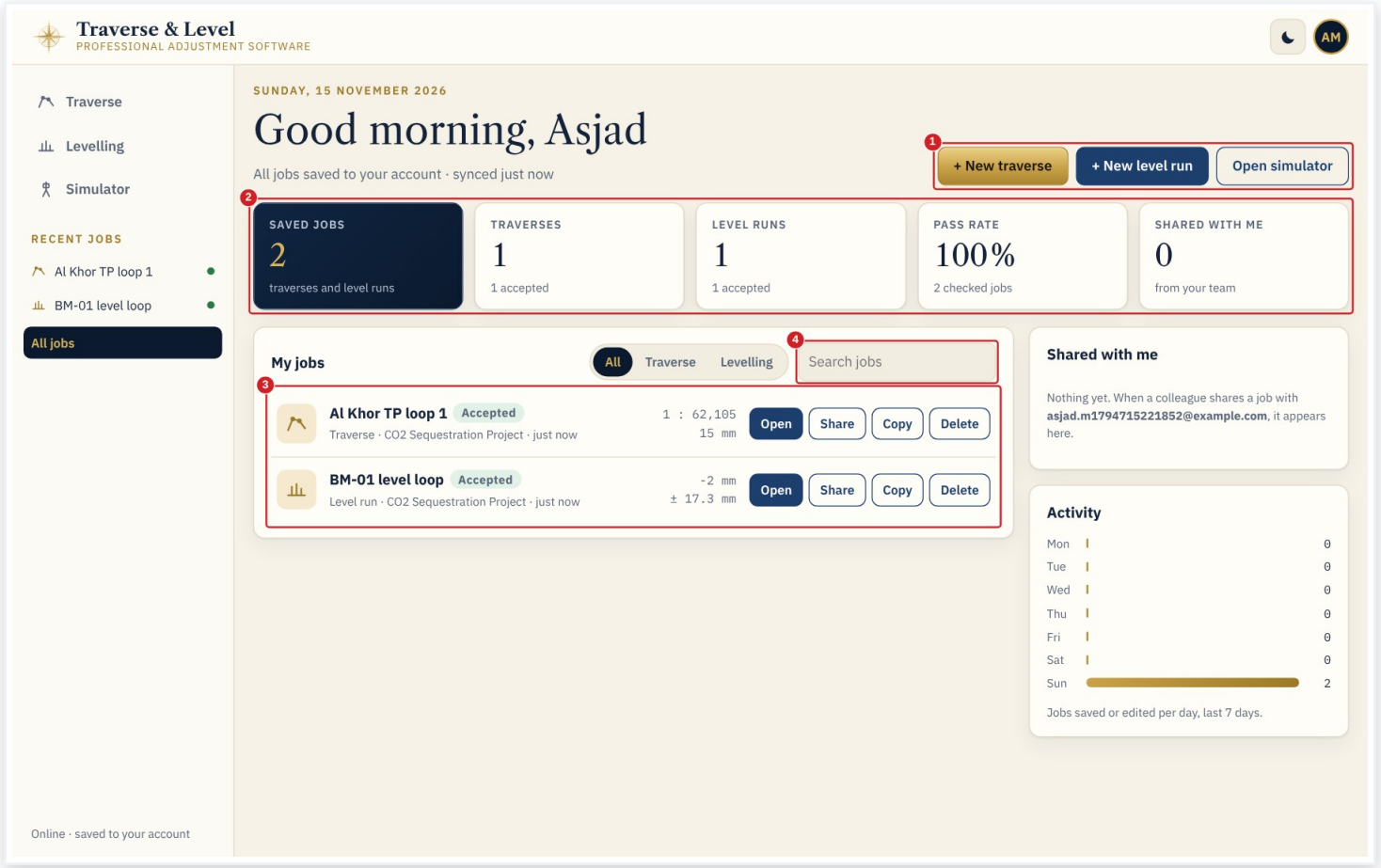
1 Result message
Tells how the simulated traverse closed, for example "Closes within 1 : 10,000" with the misclosure.

2 Adjust in Traverse tool
Sends the simulated points and observations to the Traverse screen to adjust.

3 Run a new traverse
Starts again with a new scenario number.

TIP Use the simulator for training. Try poor angle accuracy to see a traverse that gets rejected.

Dashboard and saved jobs



1 Quick buttons
Start a new traverse, a new level run, or open the simulator.

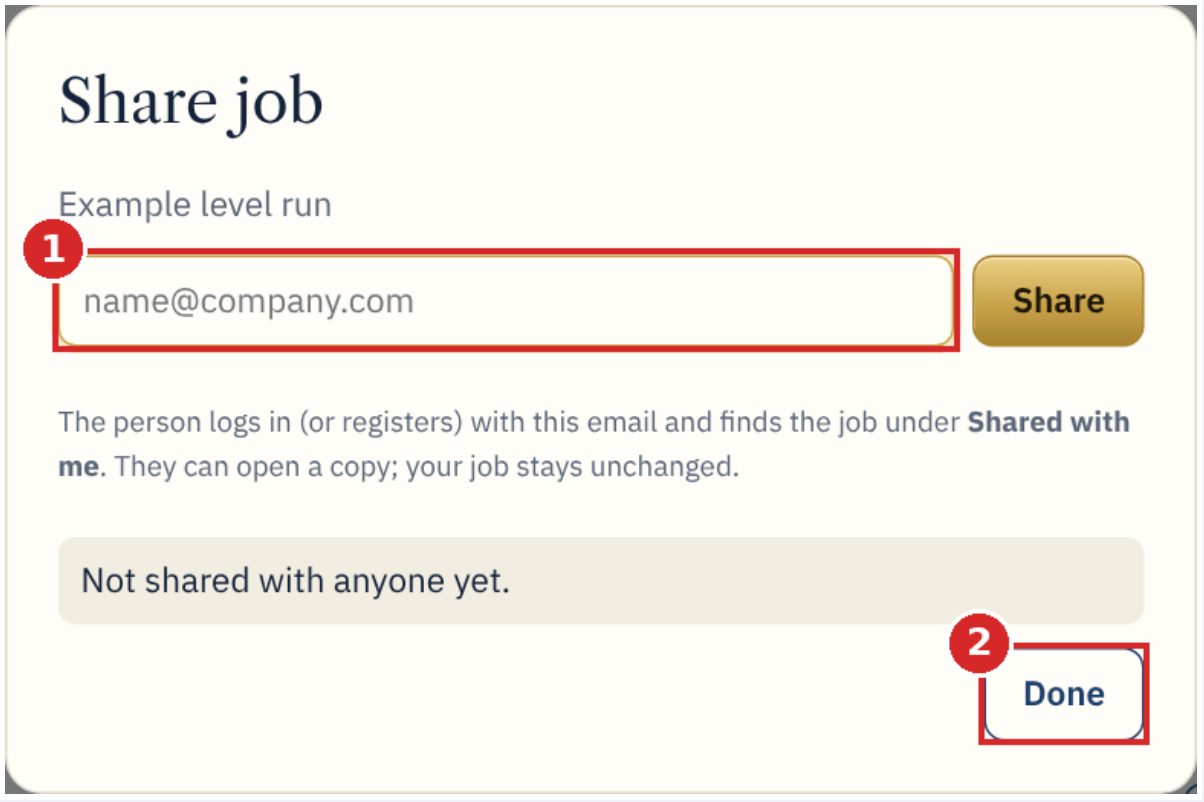
2 Summary tiles
Saved jobs, traverses, level runs, pass rate and jobs shared with you.

3 My jobs
Filter All, Traverse or Levelling. Each job has Open, Share, Copy and Delete.

4 Search jobs
Type part of a name to find a job.

TIP Open it from the profile menu (your initials) or from All jobs in the sidebar. Shared with me lists jobs from colleagues.

Share a job

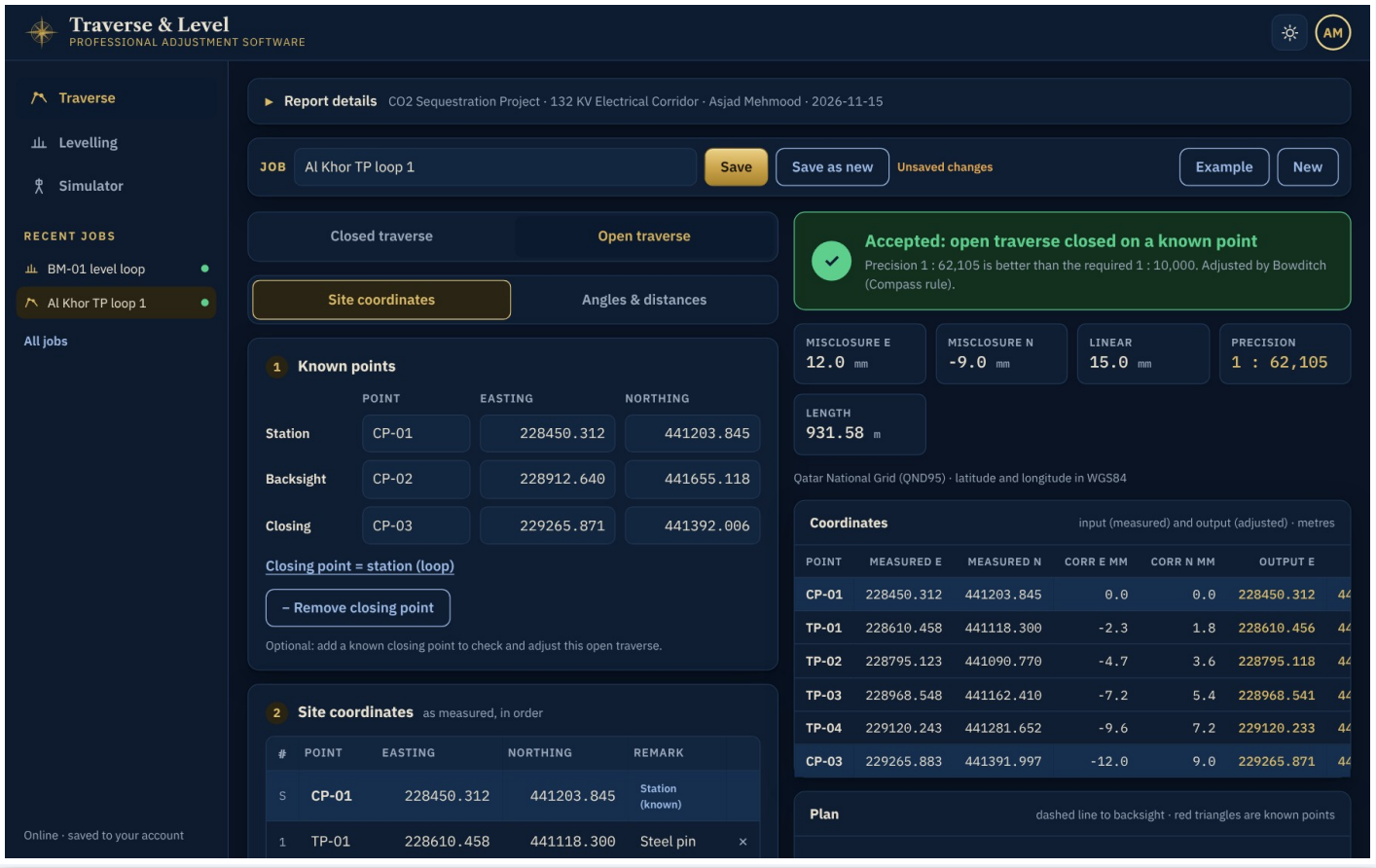


1. **E-mail address**
   Type the colleague's e-mail and press Share. They find the job under Shared with me.

2. **Done**
   Closes the dialog. The people you shared with are listed in it.

TIP The person can open a copy. Your job stays unchanged.

Dark mode and good practice



Dark mode
Use the moon button in the top bar. It suits low light and is remembered.

Save often
Press Save after the first complete result and again after edits.

Check inputs first
Known and measured closing values are the most common mix-up.

Report details
Fill them before the PDF so it is ready to issue.

Keep the original data
Use Save as new before trying another method.

QUICK REFERENCE

Which mode should I use?

	Closed traverse	Open traverse	Open + closing point (new)
Ends on	A known point	No known point	A known point
Closing point needed	Yes	No	Yes: known and measured
Misclosure and precision	Shown	Not shown	Shown
Adjustment	Bowditch, Transit or Equal	None	Bowditch, Transit or Equal
Status banner	Accepted or Rejected	Not checked	Accepted or Rejected
Output coordinates	Adjusted	As measured	Adjusted

Levelling follows the same idea: a closed loop or run to a BM is checked and adjusted, an open run is not checked.

QUICK REFERENCE

Which input should I use?

	Site coordinates	Angles & distances	Angles & distances + least squares
You type	Coordinates as measured	Angles and distances	Angles and distances
Angular and level checks	No	Yes	Yes
Side shots	No	Yes	Yes
Adjustment	Bowditch, Transit or Equal	Bowditch, Transit or Equal	Least squares, weighted
Extra results	None	Angles table, levels	Residuals, error ellipses, chi-square
Distances scale factor	Not applied	From the grid or typed	From the grid or typed

Qatar National Grid adds latitude and longitude in every mode, and Google Earth (KML) export.