

Systra

Release 8

Update Information

Service pack November 2019

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Systra Release 8.0 – Update-Information

Date: 25.11.2019

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1. Introduction

The update information of November 2018 describe significant changes, enhancements and improvements since the provision of the Systra 8.0 basic installation in December 2016.

During this period, these updates have been provided:

- (1) The Systra Service Pack July 2017
- (2) The Systra Service Pack February 2018
- (3) The Systra Service Pack July 2018

Development Priorities

Most of the work conducted in the kernel program *Sysged* (Graphic Editor) belonging to the database part. Of course, there were developments at *Systra* (adjustment and analysis), *Sysplan* (graphic analysis viewer) and some other modules to be done.

The headings of the description of the measures in chapter 2 bear a year, indicating that the update information is up-to-date. Those are

- "2019" for developments in 2019,
- „2018“ for developments in 2018 and earlier,

which are not yet written in the valid Systra documentation (manual) from December 2016.

The following lists concerning key programs give an overview of the significant new and revised features that have been in progress since July last year. In each case, the last official and the current official program version are written. The following list gives an overview of the major new and revised functionalities. In addition, the works from 2018 and a little earlier are mentioned again.

1.1.1 Sysged - Graphical Editor

Version 8.0.9.315

New (finally released October 2019):

- Complex function ALKIS-Exchange in the QL method Brandenburg
- Handling of local systems in the system browser (switching off / on, etc.)
- Rename mass function of cadastre records
- Assign observation groups

Extended or improved (finally released October 2019):

- Analysis Cycle Systra ⇔ Sysged, extended
- Import Coordinate list (old since 2016), retreated
- Extended graphical point representation (since 2018), improved
- Seal approval function for the QL database (since 2017), extended
- Reservation lists for operating km² point numbers (since 12/2018), improved
- Reservation lists for working point numbers (since 12/2018), improved
- Reservation lists for system names (since 12/2018), improved
- Context menu, extended and adapted
- Update automation between the browsers, improved

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Older Update notes from 2018:

New that time

Graphical selection of points

- ⇒ Reservation lists for km² point numbers
- ⇒ Exam NBZ for points with km² numbering
- ⇒ Filter conditions across projects
- ⇒ Area transfer with enclaves and exclaves

Extended or improved:

- ⇒ QL area calculation - comparison with book areas
- ⇒ Line transfer - Arc with vertex
- ⇒ WMS - Proxy settings for WMS (global / individual)
- ⇒ Graphic Mask Measurement Lines - Sorts
- ⇒ ALKIS point attributes - country definitions
- ⇒ Filter functions in browsers

1.1.2 SystraShell – Project Organisation

Version 8.0.2.173

New (Release August 2019):

- Control of opening input files concerning start of DLL functions
- Set windows configuration to standard

Improved (Release August 2019):

- Saving of window sizes and positions with next project start
- Handling of the dialogue Select project path considering slow network drives

Older Update Notes from 2018:

- Function to save projects to the server / to get projects from the server
- Function button for Koorchk
- Control parameters for separate treatment of zero ordinates
- Control parameters for arc – vertices
- Control parameters for Brandenburg individual

1.1.3 Systra – Adjustment and Analysis

Version 8.0.14.40

New (Release August 2019):

- Analysis parameters for observations written Systra input files
- Correction of polar measurement weight assignment after topological elimination

Extended (Release August 2019):

- Official point identity evidence document Brandenburg (Systra.BRB file)

Improved (Release August 2019):

- Sequential generation of orthogonal approximate transformation parameters

Older Update Notes from 2018:

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- Separate treatment of zero ordinates introduced
- Adjustment of circle arcs – vertex introduced
- Free network adjustment introduced
- 15 digit system names available
- Height adjustment improved

1.1.4 Sysplan – Graphic Analysis Viewer

Version 8.0.4.70

The changes of Sysplan 8.0.4.70 with respect to the before released version are only briefly described here. Rather, the developments at Sysplan focused on a completely revised Sysplan for Systra Release 9 in 2020.

Extended or improved:

- Compensation for double point numbers (Koorchk data)
- Import and memory management for large projects
- Mouse input during screen layout possible
- Bugfix when changing from printing to layout
- Bugfix when zooming with circular arcs

1.1.5 Further Programs

The maintenance of these modules is not documented in this update information, since we have not made significant changes for the expansion level Systra D2 (processing of QL projects) here.

SysMatch	Version 8.0.6.14
SysPNW	Version 8.0.3.8
SysIMP	Version 8.0.2.7
Koorchk	Version 8.0.2.17

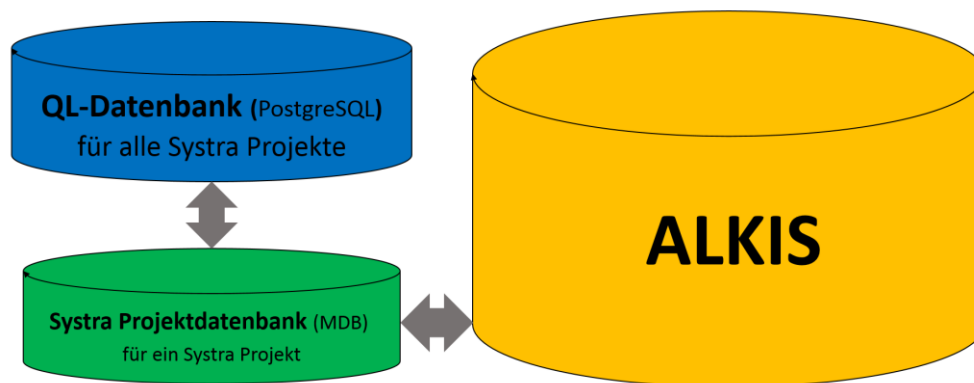
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2. Description of the Activities

2.1 Sysged – Graphical Editor (Overview)

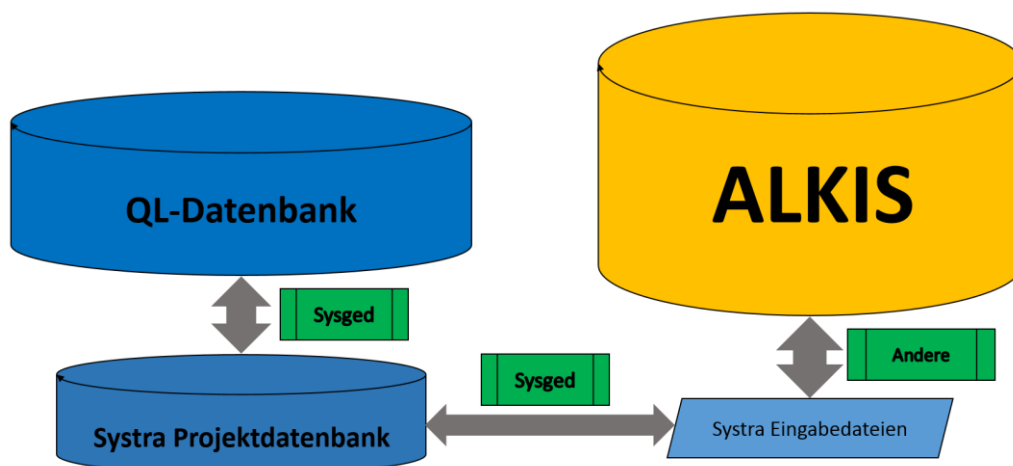
2.1.1 2018: Overview of Database Components in a QL Procedure

On the basis of ALKIS data, geodetic measurements (from existing surveying field books, survey coordinates from GNSS or polar measurements) will be recorded, compensated and analyzed in the Systra project database. The qualifying result coordinates will be transferred to ALKIS, the analyzed measurements will be stored in the QL database for archiving and reuse in later projects.



Systra Project Database, QL Database and ALKIS

The graphical editor Sysged is client for the Systra project database (type MDB) and the cross-project QL database (type PostgreSQL). Between these two databases, the geodetic measurements which are not managed in ALKIS, will be exchanged directly by Sysged.



*Sysged as a client for the Systra project database and QL database
Systra input files for the transport of ALKIS data*

The connection to ALKIS is ensured by the *Systra Input Files*. They are written and read by partner programs such as KIVID (Burg) in the QL procedure of the federal state of Brandenburg or the NAS viewer (own software of LAiV-MV) in the QL procedure of the federal state Mecklenburg-Western Pomerania, or GEO8 (Geosoft) in case of integrated Systra adjustment.

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2.1.2 2019: Extension of the Analysis Circuit

The analysis cycle Sysged/Systra has been extended. With the mask *Show Maximum Normalized Residual* direct access to the observation which is marked as the worst case observation via the NV value is now possible. Further, the NV list which has already been written to Systra.ERR and Systra.OUT before, is now displayed directly in the mask.

Maximale normierte Verbesserung

Typ: Polarstrecke

System: S POL_06

Von: NP_107

Nach: NP_101

Messwert: 3.60 [m]

Standardabweichung a priori: 1.0 [cm]


Kontrollierbarkeit: 62.1 [%]

Normierte Verbesserung: 9.0 []

Schließen MaxNV-Liste

Sysged: Mask Maximum normalized residual

Direct access to the worst observation with the biggest NV value

With the symbol  right next to the shown observation type, the concerning graphic observation mask are displayed. At system observations it is the mask of the concerning polar or orthogonal observation systems.

Polare Messungen erzeugen

Systemname: POL_06 Standpunkt: NP_107

Ausgewählte Punkte (Mindestens 2):

N.	Punkt	Richtung	S(v)	Strecke	S(v)	dl
1	NP_109	82.2000	0.0000	9.000	0.000	
2	NP_108	45.3000	0.0000	2.700	0.000	
3	GP_18	125.9000	0.0000	10.700	0.000	
4	NP_101	118.1000	0.0000	3.600	0.000	

Messwerte:

☒ Richtung: 118.1000

☒ S(v): 0.0000 [gon]


☒ Strecke: 3.600



☒ S(v): 0.0000 [m]

☐ dH

☒ S(v): 0.0000 [m]

Vorschau Neuer Punkt: Übernehmen Abbrechen Erweitern >

Sysged: Graphical input mask System of polar measurements which has been opened via Symbol 

With the symbol  right next to the symbol , a browser filtering the concerning single observation will be opened. Have multiple measurements of the same topology, those will be opened all.

Polare Messungen

Bearbeiten Ansicht Filter

ID	Standpunkt	System	Zielpunkt	An/Aus	Richtung Hz	Sigma Hz	n	Richti	Strecke	Sigma S	gem. S
170	NP_107	POL_06	NP_101	<input checked="" type="checkbox"/>	118.1000	0.0000		<input checked="" type="checkbox"/>	3.600	0.000	<input checked="" type="checkbox"/>


Datensatz: von 1 Filter: Maximale normierte Verbesserung

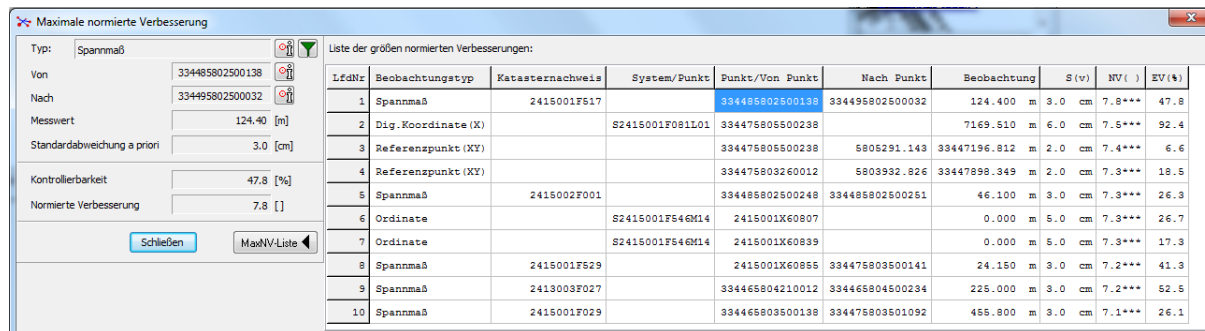
Sysged: Filter browser with a single polar measurement which has been opened via Symbol 

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Presentation of the list with the biggest normalized residuals

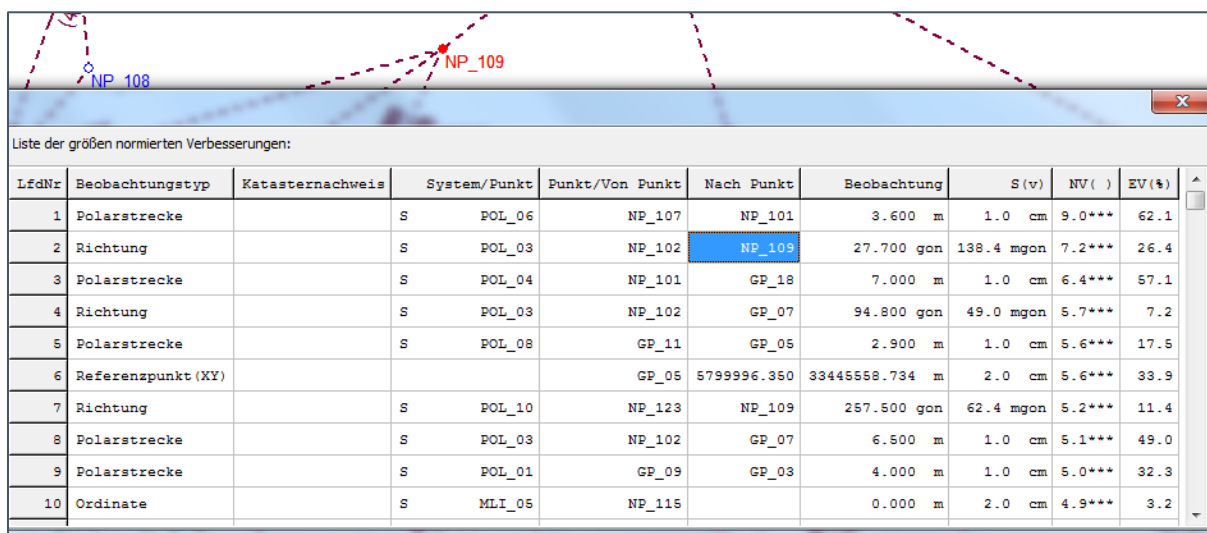
Using the Button , the list with the usually 10 biggest normalized residuals will be opened.



LfdNr	Beobachtungstyp	Katasternachweis	System/Punkt	Punkt/Von Punkt	Nach Punkt	Beobachtung	S (v)	NV ()	EV (%)
1	Spannmaß	2415001F517		334485802500138	334495802500032	124.400 m	3.0 cm	7.8***	47.8
2	Dig. Koordinate (X)		S2415001F081L01	334475805500238		7169.510 m	6.0 cm	7.5***	92.4
3	Referenzpunkt (XY)			334475805500238	5805291.143	33447196.812 m	2.0 cm	7.4***	6.6
4	Referenzpunkt (XY)			334475803260012	5803932.826	33447898.349 m	2.0 cm	7.3***	18.5
5	Spannmaß	2415002F001		334485802500248	334485802500251	46.100 m	3.0 cm	7.3***	26.3
6	Ordinate		S2415001F546M14	2415001X60807		0.000 m	5.0 cm	7.3***	26.7
7	Ordinate		S2415001F546M14	2415001X60839		0.000 m	5.0 cm	7.3***	17.3
8	Spannmaß	2415001F529		2415001X60855	334475803500141	24.150 m	3.0 cm	7.2***	41.3
9	Spannmaß	2413003F027		334465804210012	334465804500234	225.000 m	3.0 cm	7.2***	52.5
10	Spannmaß	2415001F029		334465803500138	3344758035001092	455.800 m	3.0 cm	7.1***	26.1

Sysged: The list with the 10 biggest normalized residuals will be opened with button 

Note: A direct access of the observations next to the worst one is not supported, as it would damage the data snooping principle of Baarda („Only treat the observation with the biggest NV!“). Nevertheless, all points connected to the shown observations can be focused graphically.



LfdNr	Beobachtungstyp	Katasternachweis	System/Punkt	Punkt/Von Punkt	Nach Punkt	Beobachtung	S (v)	NV ()	EV (%)
1	Polarstrecke		S POL_06	NP_107	NP_101	3.600 m	1.0 cm	9.0***	62.1
2	Richtung		S POL_03	NP_102	NP_109	27.700 gon	138.4 mgon	7.2***	26.4
3	Polarstrecke		S POL_04	NP_101	GP_18	7.000 m	1.0 cm	6.4***	57.1
4	Richtung		S POL_03	NP_102	GP_07	94.800 gon	49.0 mgon	5.7***	7.2
5	Polarstrecke		S POL_08	GP_11	GP_05	2.900 m	1.0 cm	5.6***	17.5
6	Referenzpunkt (XY)			GP_05	5799996.350	33445558.734 m	2.0 cm	5.6***	33.9
7	Richtung		S POL_10	NP_123	NP_109	257.500 gon	62.4 mgon	5.2***	11.4
8	Polarstrecke		S POL_03	NP_102	GP_07	6.500 m	1.0 cm	5.1***	49.0
9	Polarstrecke		S POL_01	GP_09	GP_03	4.000 m	1.0 cm	5.0***	32.3
10	Ordinate		S MLI_05	NP_115		0.000 m	2.0 cm	4.9***	3.2

Sysged: The list with the 10 biggest normalized residuals

2.1.3 2019: ALKIS Exchange – Complex function of the QL method

Motivation of an ALKIS Exchange

When processing large QL projects with "long processing times", there may be interim updates in the ALKIS, which should be taken into account in the QL project that is not yet completed.

For this purpose, a new data extraction is made from the ALKIS. In this prepared new QL project, all measurements recorded in the previous QL project will be imported. This takes place including the analysis information and topological point attribute values. For all points known in ALKIS and QL (km² points) that have experienced separate changes of coordinates or topological attributes in the QL project and in the ALKIS, a conflict management starts in order to eliminate the differences. The almost conflicts will be solved automatically, however remaining conflicts are brought to an interactive conflict management.

Terms of project status

During the development work, the following project designations were defined:

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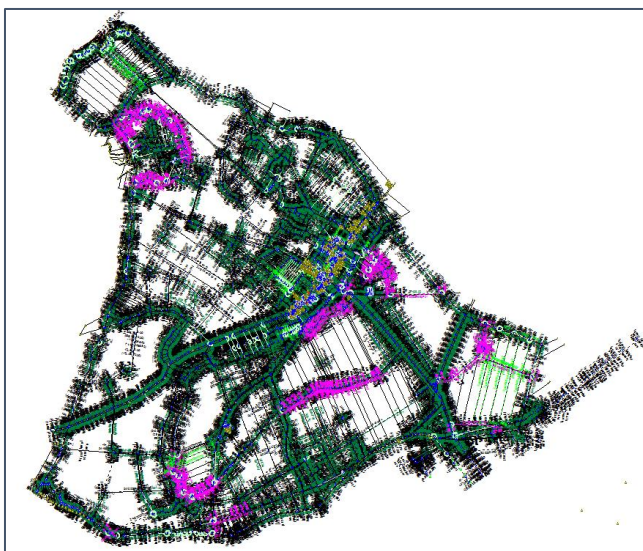
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Projekt Title	Description
QL-Alt	QL project with previous data from the ALKIS and recorded measurements. Changes to coordinates and possibly to point attributes were made.
QL-Neu	QL project with current data from the ALKIS including possible changes to coordinates and point attributes during parallel QL work.
QL-Mix	QL project with current data from QL-Neu (the ALKIS), acquired measurements from QL-Alt, further coordinates and point attributes, coordinated between QL-Neu and QL-Alt

In the *QL-Mix* project with the integrated data from *QL-New* and *QL-Old*, the QL processing is continued after the ALKIS exchange. After an exchange, *QL-Mix* gets formally the status of *QL-Alt* with all conditions for a further later ALKIS exchange.



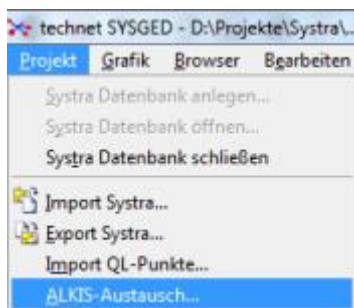
Sysged: Project QL-Neu



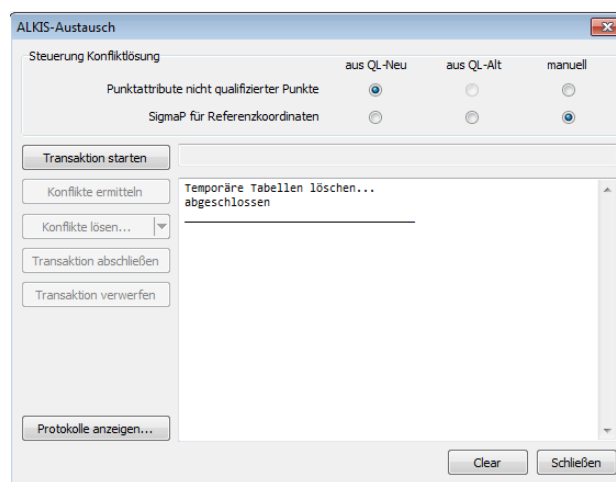
Sysged: Project QL-Mix

Steps of complex function

The data integration takes place in the project database of *QL-Neu*. The function call *ALKIS exchange*, which is placed in the Project menu, opens the ALKIS exchange screen.



Sysged: Function call ALKIS Exchange



Sysged: Mask ALKIS Exchange

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The entire implementation of the ALKIS exchange is referred to as a transaction in which interdependent work steps are performed.

As far as fixed rules are not already defined, the user decides at the beginning of the transaction about the mass handling of conflicts. Selectable is the determination of origin

1. the point attributes of the non-qualified points and
2. the standard deviations of the reference coordinates.

These only variable options are included in the total of case distinctions in the subsequent conflict determination. Here are the steps of the transaction described in the project *QL-New*.

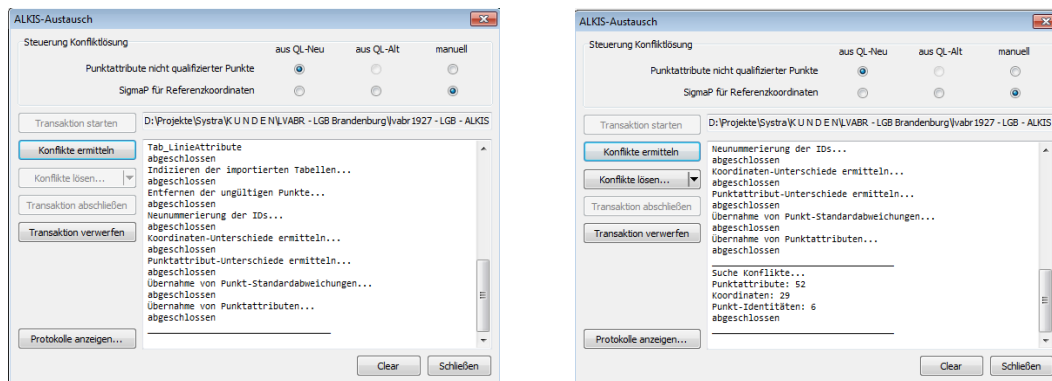
Steps of the ALKIS exchange	Description of the steps during ALKIS exchange
Start Transaction	When the transaction starts, the project database QL-Alt is selected. Their data is read into temporary tables in the project database QL-Neu. The original tables in QL-Neu still remain untouched.
Determine conflicts	The determination of conflicts takes fixed rules as agreed with the expert group of the QL method Brandenburg, and the chosen options for conflict discrimination. The different conflict cases lead to conflict treatment disclosed in error and protocol files.
Resolve conflicts	The conflict resolution implements the conflict handling rules. A distinction is made between automatic conversion (transfer from QL New, transfer from QL Alt) and manual conflict handling. The results are still stored in the temporary tables in the <i>QL-New</i> project database, while the original tables remain untouched.
Finish Transaction	Only at transaction completion the conflict-free data and conflict resolution results will be physically implemented. The original tables of QL-Neu are then supplemented or overwritten by the contents of the temporary tables and receive the project status <i>QL-Mix</i> . The temporary tables are deleted thereafter.
Discard Transaction	Discarding the transaction deletes the temporary tables and leaves the original tables in QL New untouched.
Show protocol	After the determination of the conflict, error files (ALKIS exchange _ *. ERR) can be viewed for conflict distinctions. After completing the transaction, logs (ALKIS Exchange _ *. OUT files) will prove the conflict handling.
Clear	The messages of the message window are deleted.
Close	The complex function ALKIS exchange will be closed.

Table: Working Steps of the ALKIS exchange

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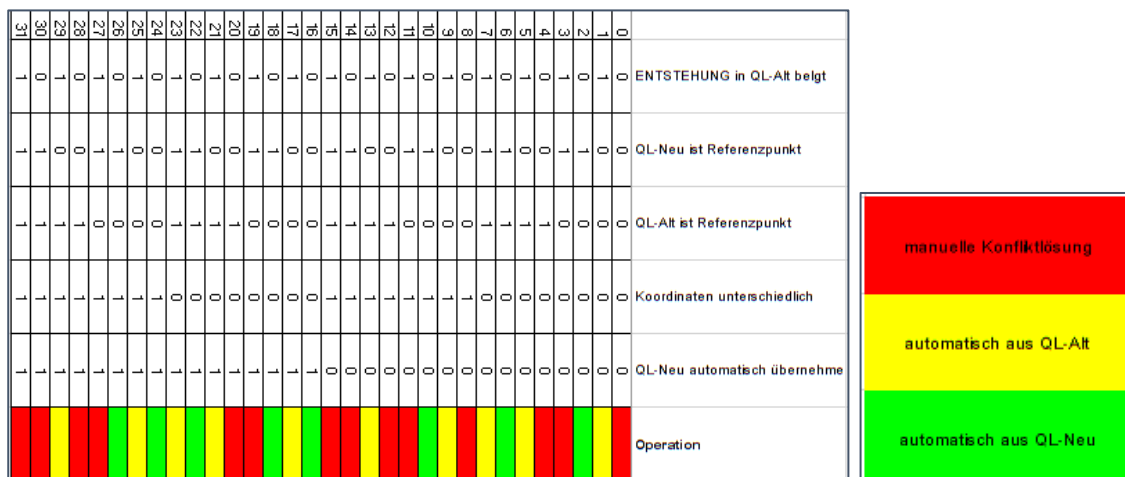
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The following pictures show the controlled dependencies of the work steps. After starting the transaction, the potential conflicts are to be determined first.

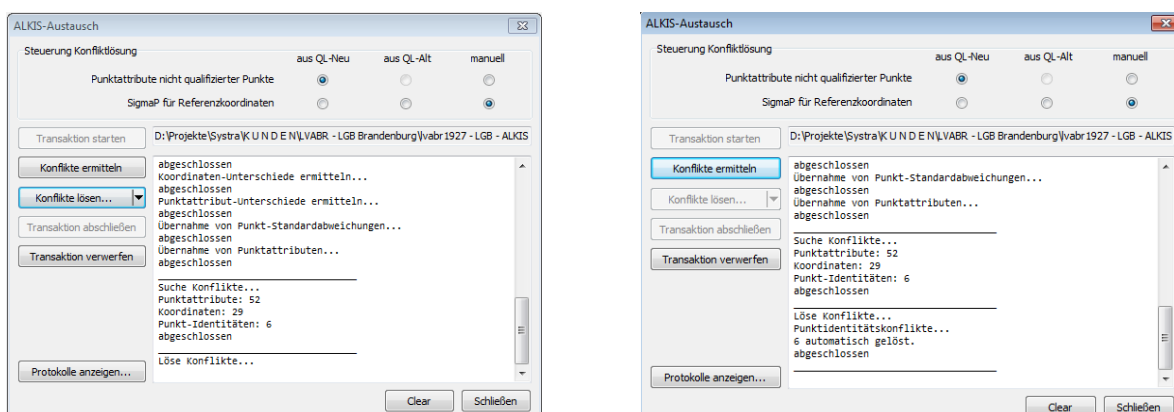


Sysged: Mask ALKIS Exchange – Transaction started Sysged: Mask ALKIS Exchange – Conflicts determined

After a conflict determination with existing conflicts, the action *Resolve Conflicts* takes place. This includes automatic or manual conflict handling.



Decision tree for conflict cases at the ALKIS exchange in the QL method of the federal country Brandenburg



Sysged: Mask ALKIS Exchange – Resolve conflicts Sysged: Mask ALKIS Exchange – Conflicts partly resolved

For manual conflict handling, the so-called conflict managers are opened without being asked. These are masks in which individual decisions about conflicts are brought about.

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There is

1. the REF Conflict Manager, which presents coordinate conflicts on reference coordinates and their standard deviation in *QL-New* and *QL-Old* for treatment. For individual decision-making, the point attributes in *QL-New* and *QL-Old* are shown here passively.
2. the PAT conflict manager that presents point attribute conflicts in QL New and QL Old for treatment.

By selecting the field with the desired output data (*QL-New* or *QL-Old*), this data is transferred to the field of result data (*QL-Mix*) and replaces the red area color, which is optical indicator of unresolved conflicts. Function keys support comfortable processing.

	QL-Neu (Vorlage)	QL-Alt (Import)	QL-Mix (Ergebnis)
ID	334475803360006	334475803360006	334475803360006
Rechts [m]	33447880.385	33447880.990	
Hoch [m]	5803573.834	5803573.785	
SigmaP [m]	0.030	0.030	0.030
DES	1000	1000	1000
GST	2100		
LZK	1	1	1
DA	31005	31005	31005

Konflikt 1 von 29

Doppelklick = Wert in QL-Mix übernehmen

Tastaturbefehle (Shortcuts):
 N = Wert von QL-Neu übernehmen
 A = Wert von QL-Alt übernehmen
 Z = Zurück, W = Weiter

OK Abbrechen <- Zurück Weiter ->

Sysged: REF Conflict Manager

Interaktive Konfliktlösung Attribute			
	QL-Neu (Vorlage)	QL-Alt (Import)	QL-Mix (Ergebnis)
ID	334475803500761	334475803500761	334475803500761
ENTSTEHUNG		QL	
DES	1000	4200	
GST	2100		
LZK	1		
SOE	5-0383-19		

Konflikt 10 von 52

Doppelklick = Wert in QL-Mix übernehmen

Tastaturbefehle (Shortcuts):
 N = Wert von QL-Neu übernehmen
 A = Wert von QL-Alt übernehmen
 Z = Zurück, W = Weiter

OK Abbrechen <- Zurück Weiter ->

Sysged: PAT Conflict Manager

Cycle of conflict determination and conflict management

Sie sind voneinander abhängige Teilaufgaben der Transaktion. Werden bei einer Behandlung nicht alle Konflikte gelöst, so bleiben die ungelösten bei der nächsten Ermittlung bestehen. In diesem Kreislauf wird die Menge der Konflikte sukzessive abgebaut. Für den Abschluss der Transaktion ist eine abschließende Konfliktermittlung, die Konfliktfreiheit anzeigen muss notwendig.

ALKIS-Austausch

Steuerung Konfliktlösung

aus QL-Neu ☒ aus QL-Alt ☐ manuell ☐

Punktattribute nicht qualifizierter Punkte ☒ ☐ ☐

SigmaP für Referenzkoordinaten ☐ ☐ ☒

Transaktion starten

D:\Projekte\Systra\K\U\N\EN\LA\BR - LGB Brandenburg\lvabr 1927 - LGB - ALKIS

Konflikte ermitteln

Konflikte lösen...

Transaktion abschließen

Transaktion verwerfen

Protokolle anzeigen...

abgeschlossen

Suche Konflikte...

Punktattribute: 4

Koordinaten: 0

Punkt-Identitäten: 0

abgeschlossen

Löse Konflikte...

abgeschlossen

Suche Konflikte...

Punktattribute: 4

Koordinaten: 0

Punkt-Identitäten: 0

abgeschlossen

Clear

Schließen

Sysqed: Mask ALKIS Exchange – Finish transaction

Sysged: Mask ALKIS Exchange –transactionfinished

Interruption of the ALKIS exchange

Due to the size of the project or the duration of the project, many occurring conflicts cannot be dealt with within the remaining daily working time, the complex function and the program can be closed, the conflict determination and handling can be continued later.

Nevertheless, it is important to ensure that no QL processing takes place in the QL-New project before completing the transaction.

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2.1.4 2019: Treatment of orthogonal observations via system browser

The dependencies of the orthogonal and polar systems (e.g. measurement lines or polar half-sets) and their associated system observations (e.g. abscissa and ordinate of a measurement line, directions and distances for polar half-sets) are now supported within the browser functionality.

The functions *Delete* and *Restore* have an effect on system observations, *Switch-off* and *Switch-on* have an effect even in both directions if all system observations are switched.

In the example, the system observations are switched off indirectly via the system.

ID	System	Ansatz	An/Aus	Beobachtungsgruppe	tx	ty	r11	r12	r21
155	2415001F006M02	4PT	<input checked="" type="checkbox"/>		5803791.766	13447776.243	0.85203985	-0.52267524	0.52267524

ID	System	PunktID	An/Aus	Ordinate	Sigma Ord gem. Ord	Abszisse	Sigma Abs gem. Abs	Katasternachweis
2320	2415001F006M02	334475803260012	<input checked="" type="checkbox"/>	30.530	0.000	184.240	0.000	2415001F006
2319	2415001F006M02	334475803260011	<input checked="" type="checkbox"/>	-38.920	0.000	195.960	0.000	2415001F006
2322	2415001F006M02	334475804240002	<input checked="" type="checkbox"/>	-35.480	0.000	257.200	0.000	2415001F006
2321	2415001F006M02	334475803260017	<input checked="" type="checkbox"/>	25.630	0.000	84.060	99.990	2415001F006

Sysged: System and System observations are switched ON

ID	System	Ansatz	An/Aus	Beobachtungsgruppe	tx	ty	r11	r12	r21
155	2415001F006M02	4PT	<input checked="" type="checkbox"/>		5803791.766	13447776.243	0.85203985	-0.52267524	0.52267524

ID	System	PunktID	An/Aus	Ordinate	Sigma Ord gem. Ord	Abszisse	Sigma Abs gem. Abs	Katasternachweis
2309	2415001F006M02	2415001817026	<input type="checkbox"/>	0.000	0.000	0.000	0.030	2415001F006
2321	2415001F006M02	334475803260017	<input type="checkbox"/>	25.630	0.000	84.060	0.000	2415001F006
2318	2415001F006M02	2415001X60500	<input type="checkbox"/>	0.000	0.000	95.100	0.030	2415001F006
2311	2415001F006M02	2415001817073	<input type="checkbox"/>	0.000	0.000	132.450	0.030	2415001F006
2320	2415001F006M02	334475803260012	<input type="checkbox"/>	30.530	0.000	184.240	0.000	2415001F006

Sysged: Switch OFF the system → indirect switch OFF of the System observations

2.1.5 2019: Expansion of the extended graphical point representation

Basics

In the extended graphical point representation, points are assigned to semantic objects (point sets). These are represented by so-called graphic objects (symbols). Allocation is determined by selectable non-geometric point attribute values (e.g., ALKIS point attributes) or ranges of geometric point attributes, precision or reliability. In addition, by means of filtering in the appropriate browser (table window) over any attribute value ranges, a set of points can be assembled. This is leaked in the resulting filter browser as a semantic filter object of the graphic.

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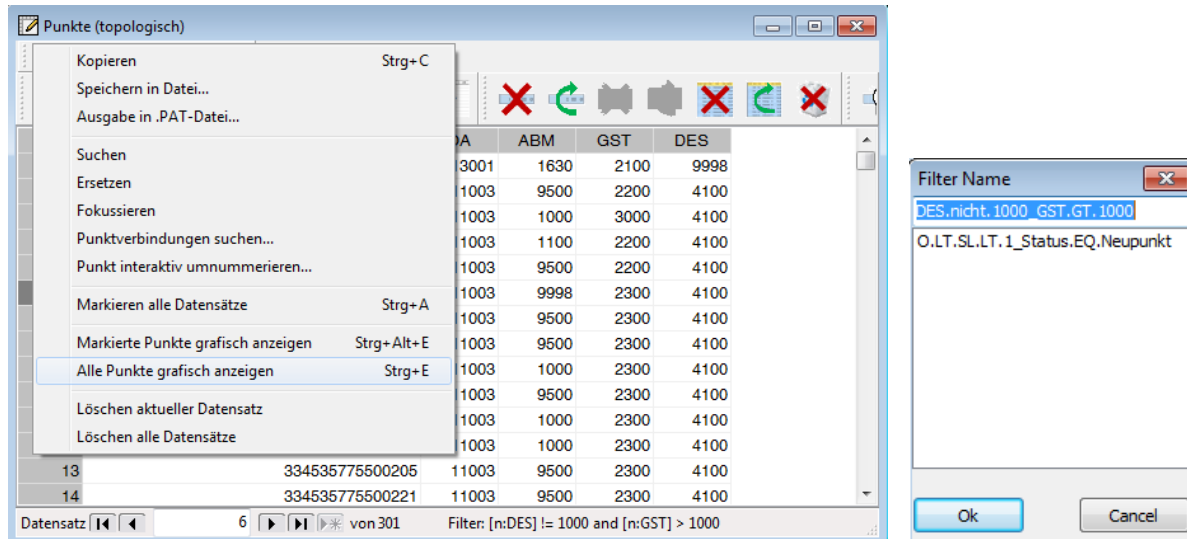
Date: 25.11.2019

Current

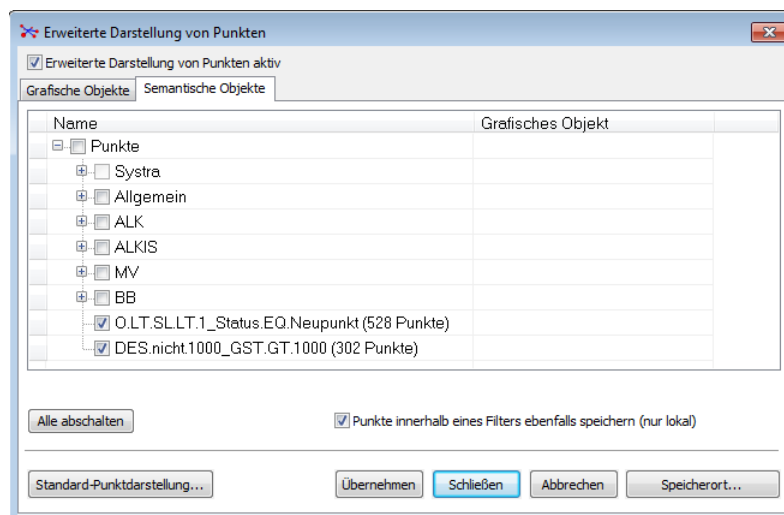
Now any number of semantic filter objects can be created and used permanently, whereas previously there was only one. The vertical display order of the semantic objects is now changeable.

Any number of filters

Previously, the semantic filter object had the fixed name FILTER. Now, when transferring the filter browser content to the graphic (see browser menu *Edit*), the desired filter name is specified and added to the semantic objects.



Sysged: Transfer filter browser to graphic - Name filter names



Sysged: Point set of the filter browser as semantic object

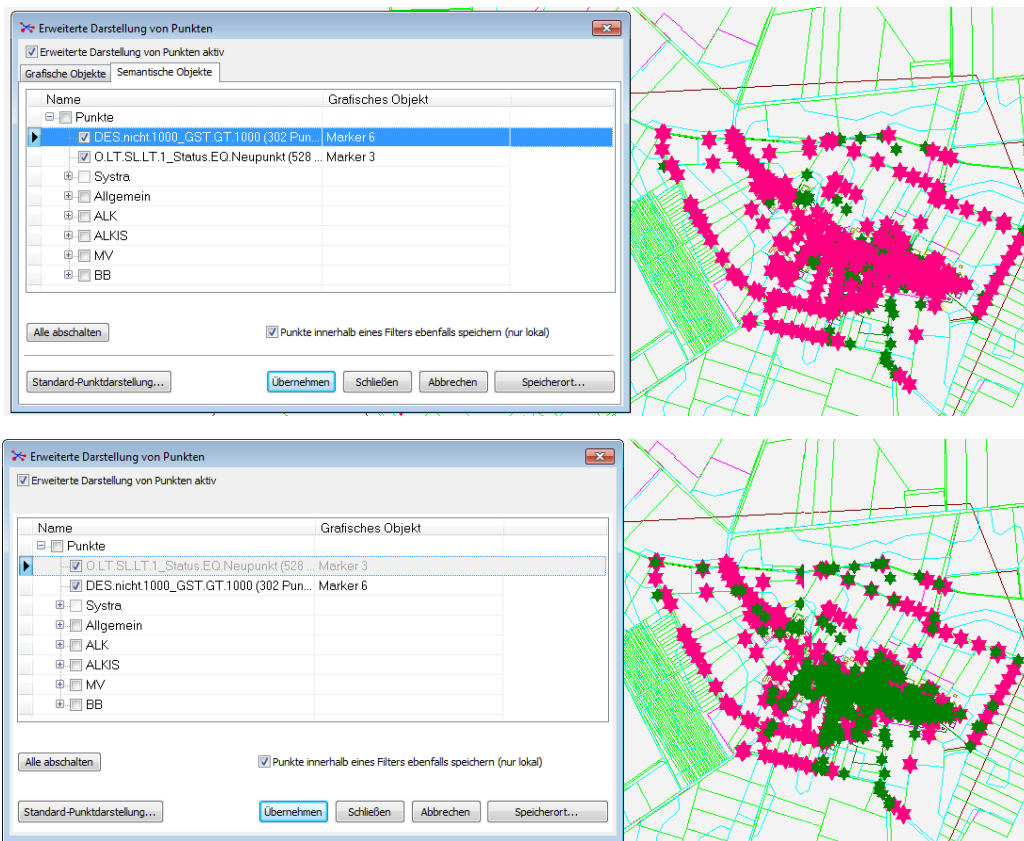
For all semantic filter objects the principle of accumulation applies. Each time it is filtered again into the respective object, its point set is expanded.

Vertical display order

The vertical display order of the semantic objects including the filter objects can be changed. After the assignment of graphic objects (symbols) and control of the on/off switching over all objects, the representation follows the principle "The overhead object covers the underlying".

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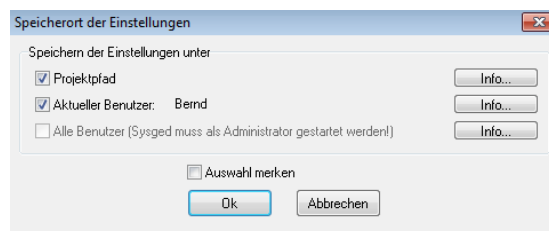


Sysged: Vertically shifted semantic filter objects

The semantic filter objects are stored in the project path. It is also possible to save the current point quantity at termination and restart.

Cross-project disposition

The semantic filter objects are stored in the file Sysged.XML and can be made available for other projects. The user path is switched on in the mask *Storage Location of Settings*, so that the file Sysged.XML - as well as Sysged.INI – will be copied to the user path (see Info button) in the course of further measures and is then later available for new projects.



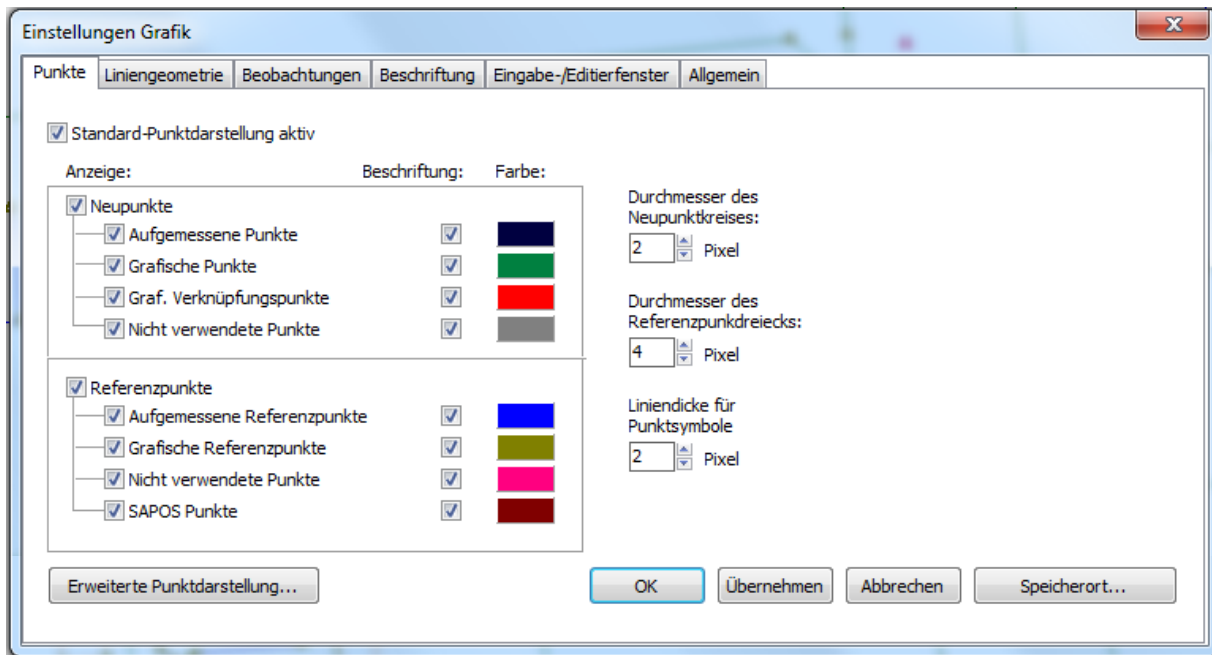
Sysged: Mask Location of the settings

Review: Extended graphical point representation (introduced 12/2018)

The function is switched via the mask *Settings/Graphic/Points*.

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Date: 25.11.2019



Sysged: Mask Settings Graphic - Points

In the above mask there are

- ⇒ the check box *Standard point display active*
- ⇒ the function button *Extended point representation...*

The checkbox has the default setting AN, which displays new points with a circle and reference points with a triangle.



Sysged: Mask Settings Graphic - Points – Switch button Standard point display

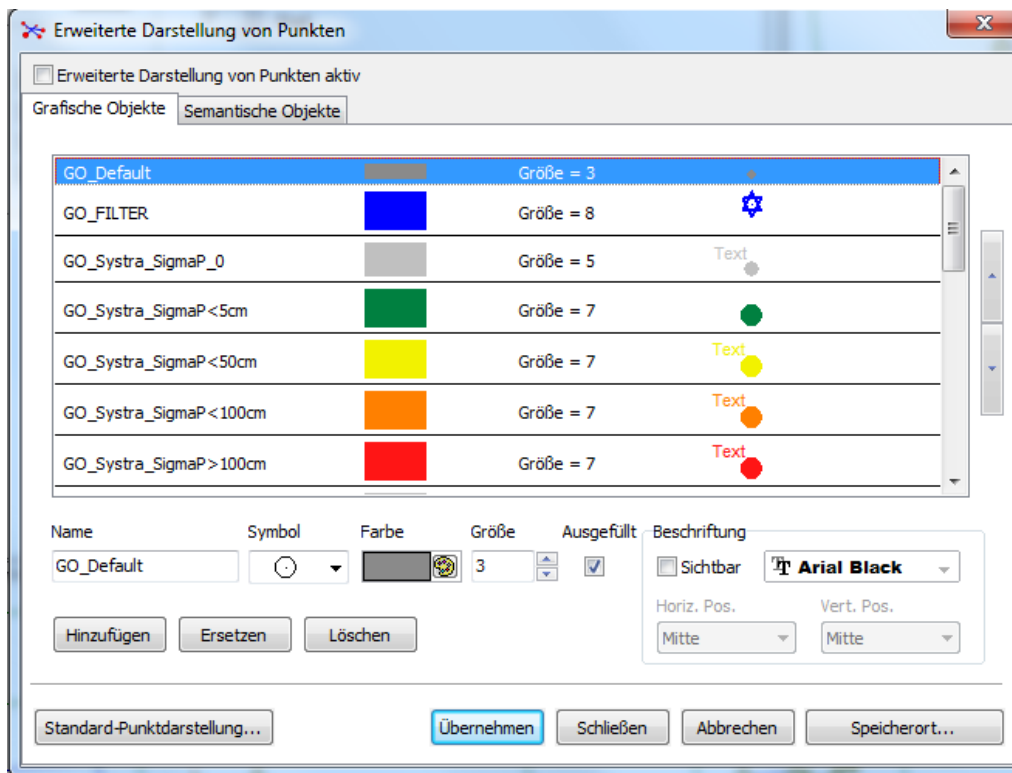
The function button leads to the screen *advanced display of points*. There are distinguished *graphical objects* and *semantic objects*.

Graphical Objects

They are used to define the graphic characteristics of point objects. These are the symbol, its frame color, the switchable fill color, the symbol size, the switchable and positionable label.

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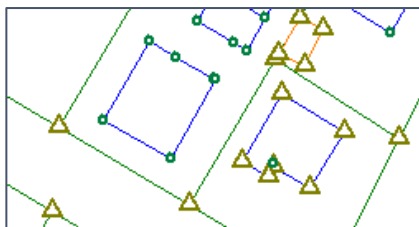
Date: 25.11.2019



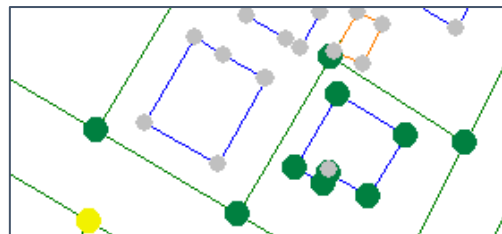
Sysged: Mask Advanced View of Points - Graphical Objects

In this mask, there are, among others, these important buttons:

- ⇒ Switch button *Extended display of points active*, which changes the display as follows.



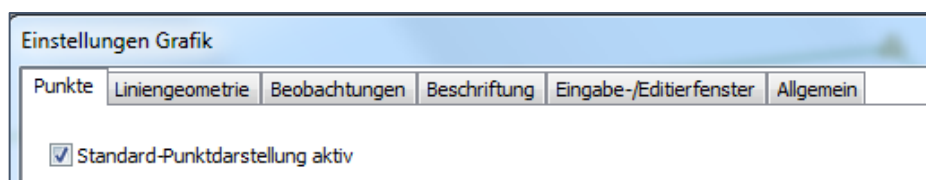
Standard point display



Extended point display

- ⇒ Selection button *Standard point display ...*

with which one returns to the mask *Settings/Graphics/Points*.



Sysged: Mask Settings Graphic - Points (excerpt)







Semantic Objects

With semantic objects, point groups are defined whose selected attributes correspond to specific values or value ranges and which are then displayed with the associated graphical object.

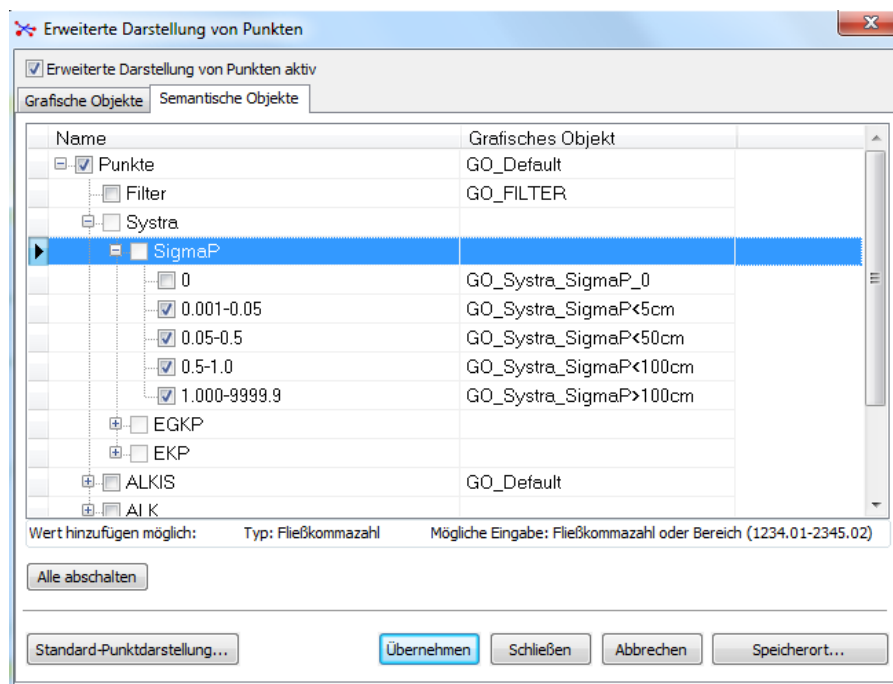
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In **example 1**, graphic objects should represent the accuracy of points. For this purpose, semantic objects were defined for the point attribute SigmaP with different value ranges, then assigned to them graphical objects which were previously defined and whose names reflect the value ranges. The latter is not absolutely necessary, but provides an overview.

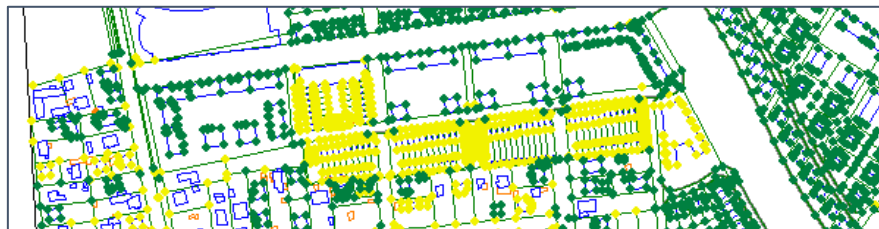
GO_Systra_SigmaP<5cm		Größe = 3	
GO_Systra_SigmaP<50cm		Größe = 3	Text 
GO_Systra_SigmaP<100cm		Größe = 3	Text 

Sysged: Mask Advanced Display of Points - Graphical Objects (excerpt)



Sysged: Advanced Points Appearance - Semantic Objects - Example 1

If you now ensure sure that the *advanced representation of points* is actively switched on, the result in example 1 is this image of the point accuracies:



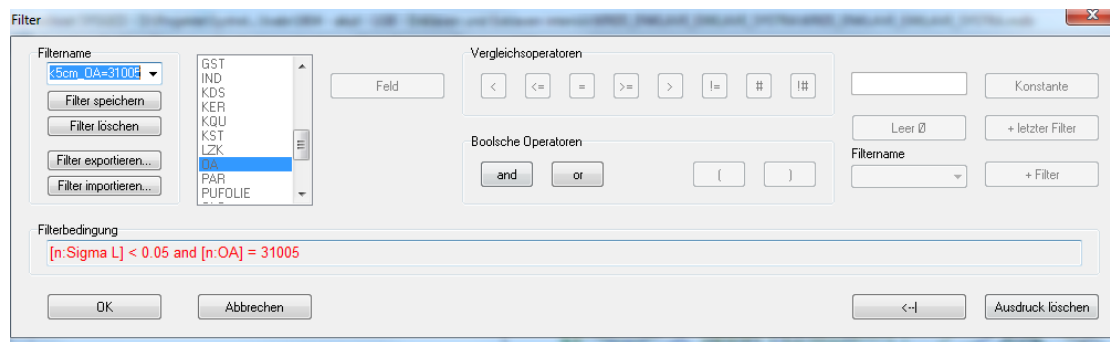
Sysged: Extended graphical point display for SigmaP (excerpt)

In **example 2**, graphic objects are supposed to display a point group in which a certain attribute combination with value ranges is filtered via a browser.

In the browser result, first all points with the object type OA = 31005 and the accuracy spectrum Sigma < 5 cm are filtered.

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Sysged: Filter for the browser Result

Zeile	PunktID	Rechts	Hoch	Sigma L	OA
3530	334085821308921	33408090.448	5821953.137	0.030	31005
3531	334085821308922	33408093.231	5821953.491	0.030	31005
3529	334085821308920	33408093.471	5821951.807	0.030	31005
3527	334085821308906	33408888.012	5821438.556	0.030	31005
3528	334085821308919	33408090.673	5821951.433	0.030	31005
3535	334085821308939	33408192.114	5821500.240	0.030	31005
3536	334085821308940	33408153.763	5821500.489	0.030	31005
3534	334085821308938	33408193.143	5821490.773	0.030	31005
3532	334085821308936	33408201.681	5821501.279	0.030	31005
3533	334085821308937	33408202.709	5821491.807	0.030	31005
3520	334085821308899	33408140.695	5821697.496	0.030	31005
3521	334085821308900	33408144.334	5821697.881	0.030	31005

Sysged: Filter browser Result

With the browser function *Edit Mark All Records* or the key combination *Ctrl+A* all records are marked. The function *Edit/Display selected data sets* starts the extended graphical point display.

Zeile	PunktID	Rechts	Hoch	Sigma L	OA
3530	334085821308921	33408090.448	5821953.137	0.030	31005
3531	334085821308922	33408093.231	5821953.491	0.030	31005
3529	334085821308920	33408093.471	5821951.807	0.030	31005

Sysged: Filter Browser Result - Select All Records

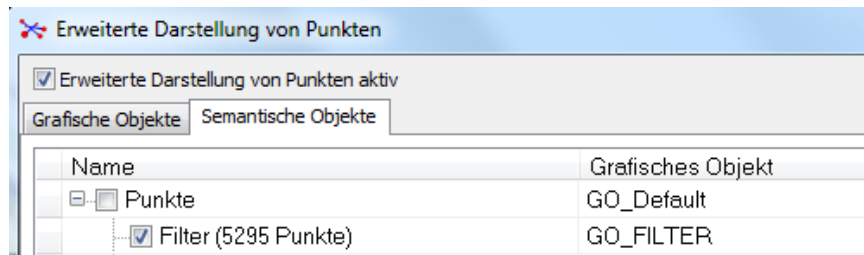


Sysged: Advanced Points Display Mask - Graphical Object GO_Filter (excerpt)

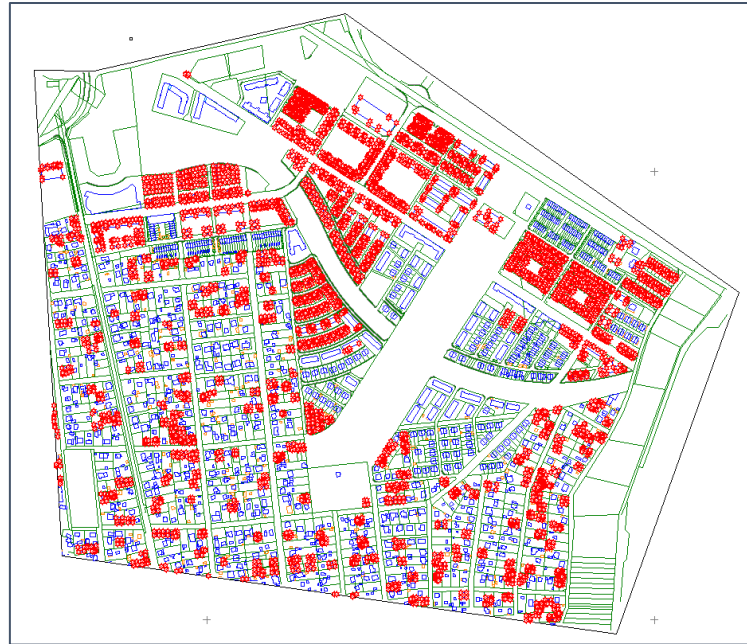
Note: The semantic object *Filter* can be filled additively. For this purpose, only further datasets must be marked, which can be done directly or by prior filtering in the browser. In **example 2**, the filtered data sets were all marked and no further data records were added, see the following picture.

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Date: 25.11.2019

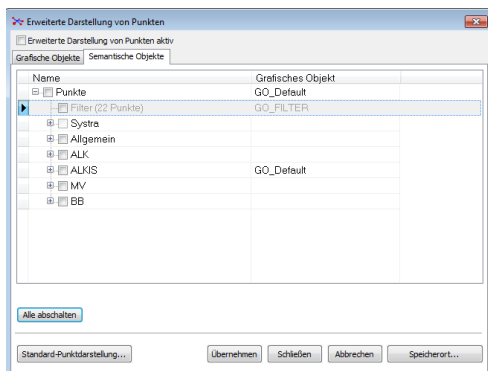


Sysged: Advanced Points Display Mask - Semantic Object Filter selected

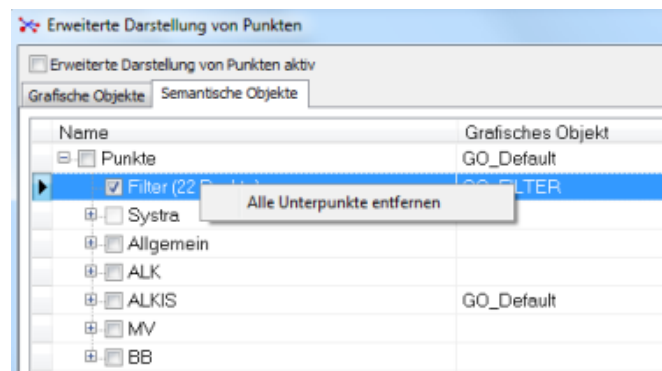


Sysged: Extended graphical point display following filter (excerpt)

In the **example 2** shown above, all semantic objects were switched off before filtering with the button *Switch off All*, then the semantic object *Filter* with *Remove all sub points* was emptied and switched on again.



Sysged: Switch OFF all Semantic Objects



Sysged: Empty Filter then switch it ON again

2.1.6 2019: Mass function Rename Field Book Names

Analogous to the existing mass functions for the renumbering of points, systems and stochastic observation groups, there is now a function for renumbering field book names with a from/to list.

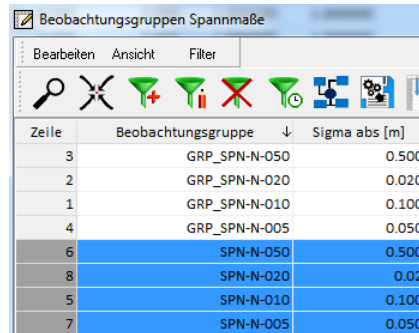
Systra Release 8.0 – Update-Information

Date: 25.11.2019

2.1.7 2019: Mass function Assign Observation Groups

This feature supports the renumbering of unofficial names of observing groups in official names according to the country's QL guidelines. As a prerequisite, both names are in the Systra database after the newer official names have been imported into the database via the appropriate Systra input

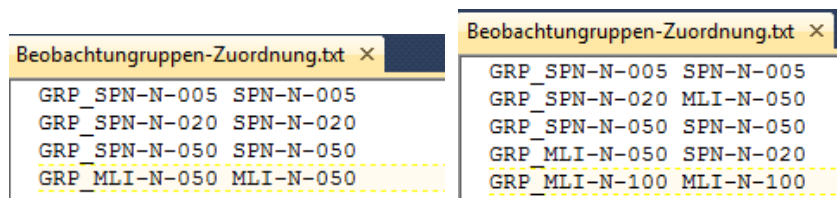
file <observational groups> .SYS.



Zeile	Beobachtungsgruppe	Sigma abs [m]
3	GRP_SPN-N-050	0.500
2	GRP_SPN-N-020	0.020
1	GRP_SPN-N-010	0.100
4	GRP_SPN-N-005	0.050
6	SPN-N-050	0.500
8	SPN-N-020	0.02
5	SPN-N-010	0.100
7	SPN-N-005	0.050

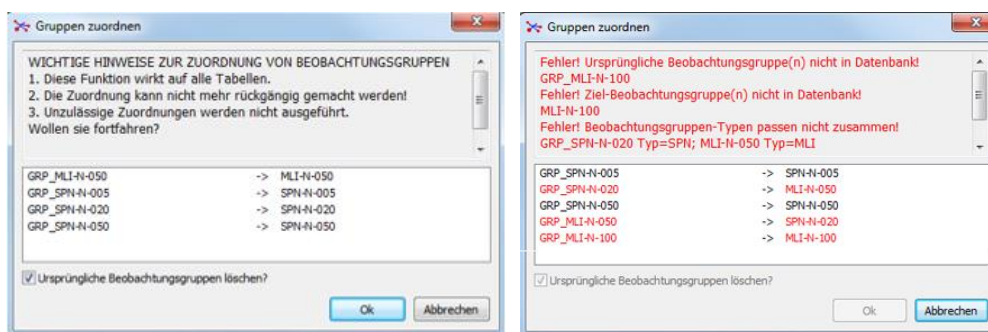
Sysged: Observation groups of tape distances
(official group names marked in blue)

With the function call *Edit/Assign Observation Groups...*, a column-oriented mapping file carrying from/to list will be selected. It checks the existence of each of the names in the database, then the correct observation group type assignment will be checked.



Beobachtungsgruppen-Zuordnung.txt	Beobachtungsgruppen-Zuordnung.txt
GRP_SPN-N-005 SPN-N-005	GRP_SPN-N-005 SPN-N-005
GRP_SPN-N-020 SPN-N-020	GRP_SPN-N-020 MLI-N-050
GRP_SPN-N-050 SPN-N-050	GRP_SPN-N-050 SPN-N-050
GRP_MLI-N-050 MLI-N-050	GRP_MLI-N-050 SPN-N-020
	GRP_MLI-N-100 MLI-N-100

Sysged: Mapping file (examples) - without or with incorrect mappings



Sysged: Assign mask to groups - without error message or with error messages

If there is no error, the irreversibility of the process is indicated and the assignment is given the OK. The renamed group names are finally deleted.

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Date: 25.11.2019

2.1.8 2019: Import coordinates list

The rather old function has been retreaded. The basic rules were retained (column-oriented import file, column selection, target table specification) and extended by the reading of the observation type SAPOS coordinates (SIGNAL measurements) and of ALKIS point attributes.

Import Koordinatenliste

Datei: D:\Projekte\Systra\Testprojekte\IMPORT Koordinatenliste\Neuer Import Datenprüfung\Neuer Import Datenprüfung REF neu.LST

334455774209991 33445570.0000 5774450.0000 0.0000 2.00 1

Prüfung / Import

☒ Import ☐ Datenprüfung

Systemname

ReferenzKoo_01

In Datenbank speichern als

☒ Referenzkoordinaten

☐ SAPDS-Koordinaten

☐ Digitalisierte Koordinaten

☐ Abszissen und Ordinaten

☐ Globale Näherungskoordinaten (Ergebnis)

☐ Lokale Hilfskoordinaten

☐ Nur Punktattribute

Attribut aus Gruppe

☐ ALK

☒ ALKIS

☐ BB

☐ MV

Bereich von Spalte - bis Spalte

<input checked="" type="checkbox"/> Punktnummer	1	15	Auswahl Spalten
<input checked="" type="checkbox"/> Rechtswert	18	29	Auswahl Spalten
<input checked="" type="checkbox"/> Hochwert	34	44	Auswahl Spalten
<input type="checkbox"/> Höhe	0	0	Auswahl Spalten
<input type="checkbox"/> Beobachtungsgruppe	0	0	Auswahl Spalten
<input type="checkbox"/> Standardabweichung Lage [cm]	0	0	Auswahl Spalten
<input type="checkbox"/> Entstehung	0	0	Auswahl Spalten
<input type="checkbox"/> Quelle	0	0	Auswahl Spalten
<input type="checkbox"/> Datum	0	0	Auswahl Spalten
<input type="checkbox"/> Text	0	0	Auswahl Spalten

Kommentarzeichen

Zeilen, die mit einem dieser Zeichen beginnen, werden beim Einlesen ignoriert

☐ Diesen Dialog beim nächsten Export nicht mehr anzeigen

OK Als Standard definieren Datenprüfung... Abbrechen

Sysged: Mask Import coordinate list

A message box reports on overview about the import results.

Import_Koordinatenliste

22 Zeilen ausgewertet.
10 Zeilen übernommen.
12 Zeilen zurückgewiesen.

Soll die Protokolldatei geöffnet werden?.

Ja Nein

Sysged: Message concerning the Import of a coordinate list

Further a protocol with excerpted information will be generated.

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Date: 25.11.2019

Sysged Version: 8.0.9.296

Datum : 29.07.2019 16:51:01

Funktion : Import Koordinatenliste

Datei : Neuer Import Datenprüfung_DIG_Koordinaten.LST

=====

Vorhandene Punkte beibehalten

LfdNr	PunktID	Zeile	x-alt	y-alt	x-neu	y-neu	Differenz
1	334455774200001	(17)	5774443.4920	33445558.7960	5774443.4860	33445558.7890	0.0092
2	334455774200002	(18)	5774441.6530	33445560.6490	5774441.6420	33445560.6560	0.0130
3	334455774200003	(19)	5774439.7460	33445559.4220	5774439.7510	33445559.4330	0.0121
4	334455774200004	(20)	5774440.4270	33445557.0380	5774440.4350	33445557.0430	0.0094
5	334455774200006	(12)	5774442.5390	33445553.5300	5774442.5420	33445553.5450	0.0153
6	334455774200007	(14)	5774443.2540	33445555.7780	5774443.2770	33445555.7370	0.0470
7	334455774200008	(16)	5774442.0960	33445558.1960	5774442.0870	33445558.1870	0.0127
8	334455774200009	(22)	5774443.1180	33445562.5220	5774443.1210	33445562.5320	0.0104
9	334455774200010	(21)	5774439.8140	33445562.3520	5774439.8220	33445562.3620	0.0128

Übernommene Punkte

LfdNr	PunktID	Zeile	x	y
1	334455774200001	(1)	5774443.4920	33445558.7960
2	334455774200002	(2)	5774441.6530	33445560.6490
3	334455774200003	(3)	5774439.7460	33445559.4220
4	334455774200004	(4)	5774440.4270	33445557.0380
5	334455774200005	(5)	5774441.2110	33445555.4710
6	334455774200006	(6)	5774442.5390	33445553.5300
7	334455774200007	(7)	5774443.2540	33445555.7780
8	334455774200008	(8)	5774442.0960	33445558.1960
9	334455774200009	(9)	5774443.1180	33445562.5220
10	334455774200010	(10)	5774439.8140	33445562.3520

Datensätze insgesamt: 22

Übernommen: 10

zurückgewiesen: 12

Sysged: Protocol concerning the Import of a coordinate list

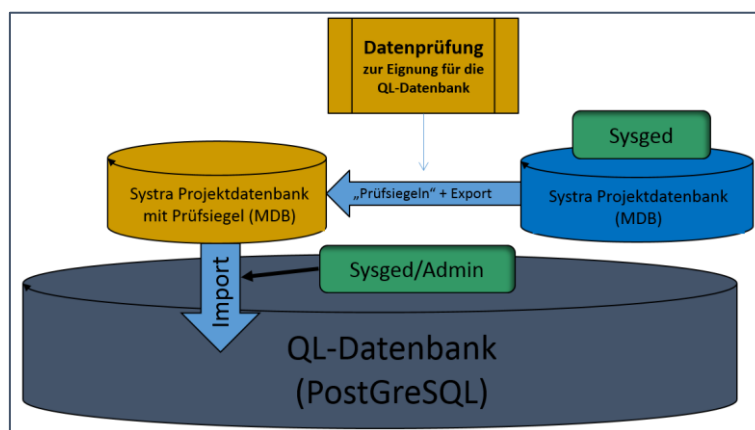
2.1.9 2019: Extension of the Qualifying Examination for the QL Database

Qualification testing of QL process data for the import of completed QL projects into the QL database has been in operation since its first release in 2015. The officially called function *Create QL-DB Load File...* (Its unofficial name is "Seal of approval function") has been adapted since then to the extended requirements. This year measures was e.g. the rejection of local systems without transformation parameters and the avoidance of inappropriate dates for result coordinates.

Review: Meaning of the „Seal of approval function“

The function *Project/ Create QL-DB load file* performs a data check on the content of a Systra project database regarding its suitability for import into the QL database. If the check is successful, the intended database is written to a so-called *QL-DB load file*, that file is provided with a "seal of approval". This quality feature is checked when importing the load file into the QL database.

However, common use of the "Seal of approval function" is more often just to check the acquisition rules during the data typing, without the necessity to carry out load file generation.



Scheme: Data check for suitability for the QL database

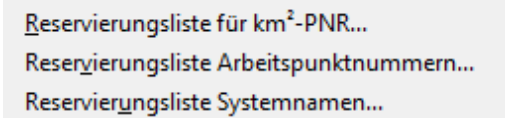
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The check follows the rules of the QL acquisition guidelines for the generation of project names, point numbers, system names and cadastral records. Excluded in the test are graphically remaining points (e.g., “#”-points) that have no common point number in ALKIS and QL, and the measurements at these points (geometric conditions). A test protocol is written, which specifies the measures for qualification in a next test.

2.1.10 2019: Reservation Lists for Point Numbers and System Names

The functions for allocating reserved point and system names, which were released in December 2018, have been successfully piloted in the first half of 2019. The Settings menu contains the function calls for providing the following reservation lists:



Sysged: Provision of reservation lists in the Settings menu

Responsible for the management of point numbers or system names are:

- for km² point numbers the ALKIS system
- for working point numbers the QL database
- for system names the QL database

Working point numbers and system names are only maintained in QL projects and not in ALKIS.

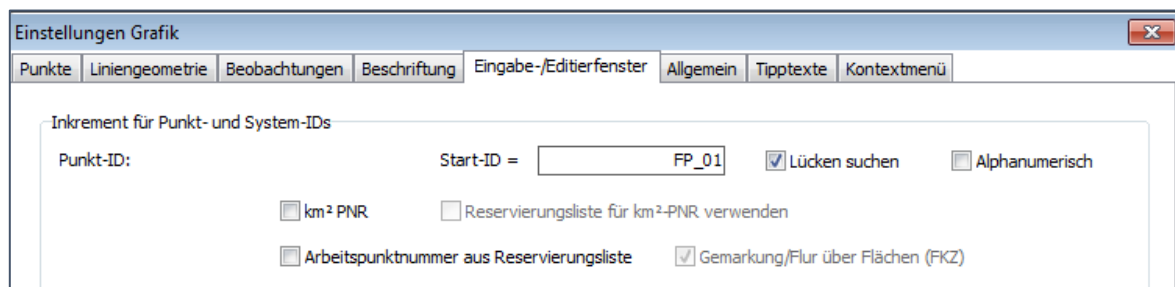
Provision and work with reserved point numbers

For an automatic assignment of new point numbers, these options are offered:

- (0) Individual point identifiers with numerical or alphanumeric increment
- (1) km² point numbers of the ALKIS, being uniform official point numbers in Germany
- (2) Working point numbers (APNR) according to regulatory framework in the QL method

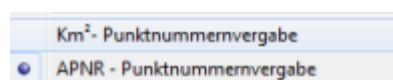
Selection of the variants (0), (1) or (2)

The basic definition is made via the Mask Settings Graphic - *Input/Edit Windows*.



Sysged: Mask Setting/Graphics - Input / Edit Windows (excerpt)

For the selection of (1) or (2) quick changes via context menu are also possible:



Sysged: Context menu (excerpt)

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(0): Individual Point Numbers

You set a start ID for the point number, from which the next free numbers are assigned in ascending order. It follows the largest point number already consumed in the project. Alternatively, you can use the *Find Gaps* option to fill free numbers between the start ID and the next largest consumed point number. The alphanumeric option allows to search for numeric increments (0-9) as well as alpha characters (A-Z, a-z) independently of gaps.

(1): km²-Point Numbers

In Germany, km² point numbers are used to guide official points of the real estate cadastre, which is maintained in the ALKIS.

Differences between Mecklenburg-Western Pomerania and other federal states of Germany

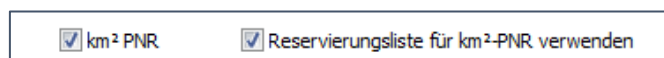
Country-specific variants for the composition of the km²-PNR are the almost uniform rule in Germany and the special rule practiced only in Mecklenburg-Western Pomerania (M-V).

km ² point numbering	Ostwert [m]	Nordwert [m]	km ² -PNR
Germany except M-V	33423548.	5799907.	334235799502321
Mecklenburg-Western Pomerania (M-V)	33320010.	6006886.	333602006200001

Examples for km²-point numbering in the federal states of Germany

The selection of the federal state and thus the km² rule is done - as for some other Sysged control parameters - centrally via the Systra control file <projectname>.INI (see description of SystraShell).

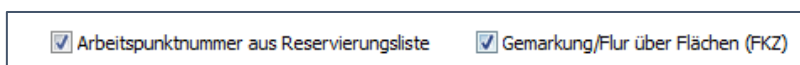
When assigning km²-PNR you can use reservation lists or assign the km²-PNR freely. In QL procedures, the use of reservation lists is binding, as they are made available in coordination with ALKIS.



Sysged: Mask Settings Graphic - Input/Edit Windows (excerpt)

(2): Working point numbers (APNR)

When assigning APNR, you can use reservation lists or assign the APNR freely. In QL procedures the use of the reservation lists is binding, as they are made available in coordination with the QL database. In QL projects, which also get those official areas from ALKIS, the additional option Marking/Field over Areas (FKZ) is helpful. This automatically recognizes the cadastral district (GGGG) and field (FFF), so that the first 7 characters of the APNR ("GGGGFFF" see below) are determined in a function-controlled manner.



Sysged: Mask Settings Graphic - Input/Edit Windows (excerpt)

Uniformity in the federal states of Brandenburg and Mecklenburg-Western Pomerania

Both federal states use the QL procedure. Their rules have no differences for the assignment of working point numbers, which are made up of the following name components:

Federal state	Structure of the working point number
Brandenburg	GGGGFFFX00001
Mecklenburg-Western Pomerania	GGGGFFFX00001

Übersicht der unterstützten Struktur von Arbeitspunktnummern

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Date: 25.11.2019

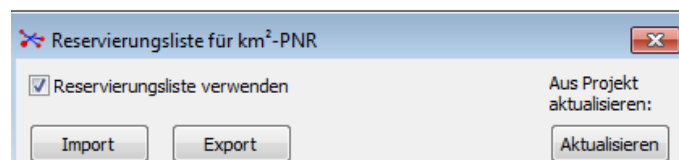
District key	Field key	Place holder	Consecutive number
4-digit character sequence	3-digit character sequence	1-digit arbitrary character	5-digit numeral sequence
GGGG	FFF	X	00001

Meaning of the name components of the working point numbers (from the QL entry notes)

(1): Provision of a reservation list for km² point numbers

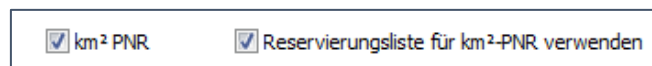
There are km² reservation lists which are generated in ALKIS and made available for external applications such as official surveying and the QL procedure.

The import of list files (XML files or column oriented text files) is done with the function Import via the mask Reservation list for km², which is called up with the function Settings/Graphic - Input/Reservation list for km²...



Sysged: Mask reservation list for km²-PNR (excerpt)

In this mask the option Use reservation list can be activated. Equivalent is the switching of the combination in the Mask Settings Graphic - Input/Edit Windows.



Sysged: Mask Settings Graphic - Input/Edit Windows (excerpt)

After importing the reservation list file(s), the available km² point numbers are displayed in black color in the mask window.



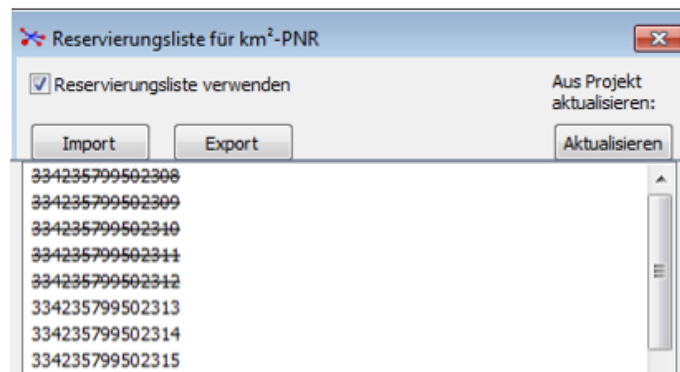
Sysged: Display of imported km² point numbers

Working with the Reservation List

Conflicts which could arise due to km² point numbers already existing in the QL project, are marked in this internal list by crossing out the already assigned point numbers and are subsequently taken into account. With the *Update* function, an active comparison of the existing km² PNR in the project with those available in the reservation can be carried out.

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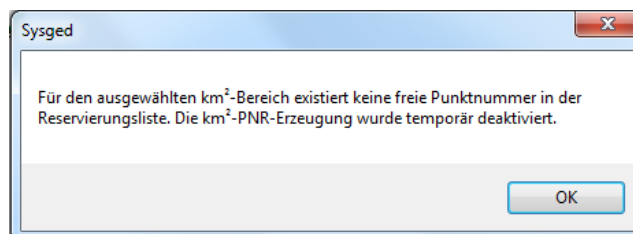
Sysged: display of already used and available km² point numbers

The internal reservation list can be processed individually using the *Free*, *Lock* and *Delete* functions.



Sysged: editing options for the displayed km² point numbers of the internal list

If the point numbers which should be available for the kilometer square have been used up, a warning message is issued at the next PNR allocation:



Sysged: Message when km²-PNR are no longer available for the respective km² square.

The internal list is replenished with the import of data from a new reservation file.

Finally, you can use the Export function to export the accumulated reservation list to a simple text file. The character "*" precedes the point numbers which are used in the project.

```
*334455986200023
334455986200024
*334455986200102
*334455986200103
```

Export file of used and free km² point numbers

(2): Provision of a Reservation List for working point numbers

In the notes on entry of a QL procedure, specifications are made for the nationwide uniform assignment of working point numbers (APNR) in order to guarantee their unambiguous assignment in the QL database, in which the responsible administration of the APNR takes place.

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APNR are usually assigned in the QL project to new points which are not QL candidates (boundary points, building points, polygon points) but serve as support points or auxiliary points in the construct of a field book (survey plan).

Reservation lists for APNR can be generated and directly processed in the current QL project via requests to the connected QL database. For projects without connection to the QL database, reserve lists provided by the authority in charge of the QL database must be imported.

The function for providing APNR is called up via the Settings menu and the *Reservation List Working point numbers* mask is opened.

Sysged: Mask Reservation List Working Point Numbers

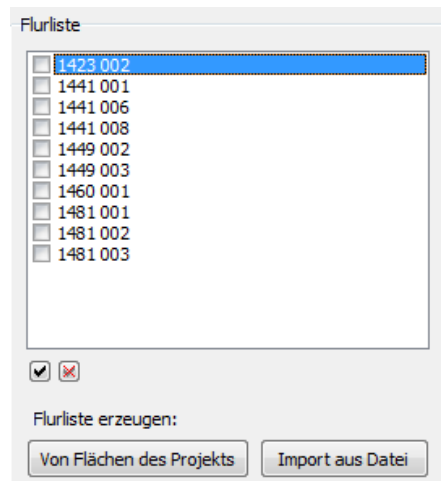
The functional areas of the mask are subsequently described in the order of the usual steps.

Generation of the field list


In the *field list*, the name combinations district/field are written in order to query APNRs in the QL database followed by their selection or to generate new free APNRs based on its availability in the database.

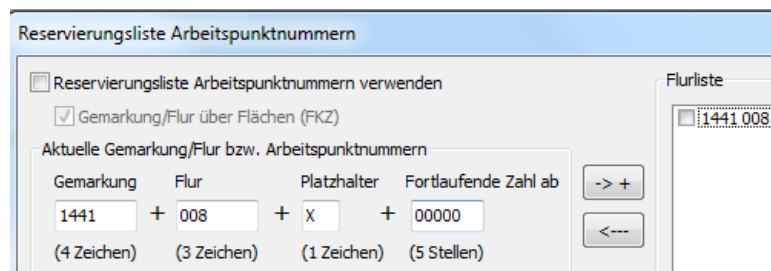
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Sysged: Mask Reservation List Working Point Numbers (excerpt) - Field List

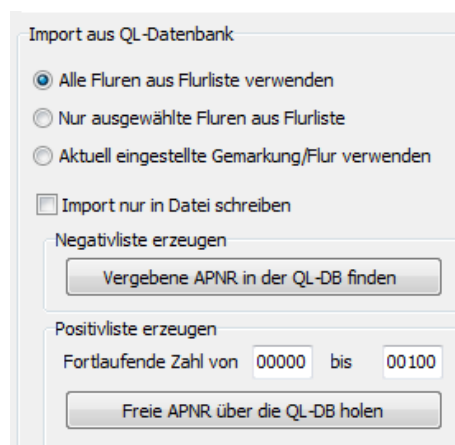
In a QL project that contains ALKIS areas (parcels), the field list can be automatically generated with the function *From areas* of the project by pushing a button. The field list can alternatively be filled with the function *Import from file* (a simple text file with a data sets containing district (four digits) and field (three digits), both texts separated by a space) or interactively with the input of marker and field together with pressing the addition key .



Sysged: Mask reservation list working point numbers - section interactive inputs / field list

Import from the QL database - negative and positive list

With the selection of a desired number of *district field* combinations from the field list, already existing APNR of these *district field* areas are queried and taken from the QL database. Optionally, free APNR are generated with respect to their availability for free use. The results both options are called *negative list* and *positive list*.



Sysged: Mask reservation list working point numbers - section import from QL-database.

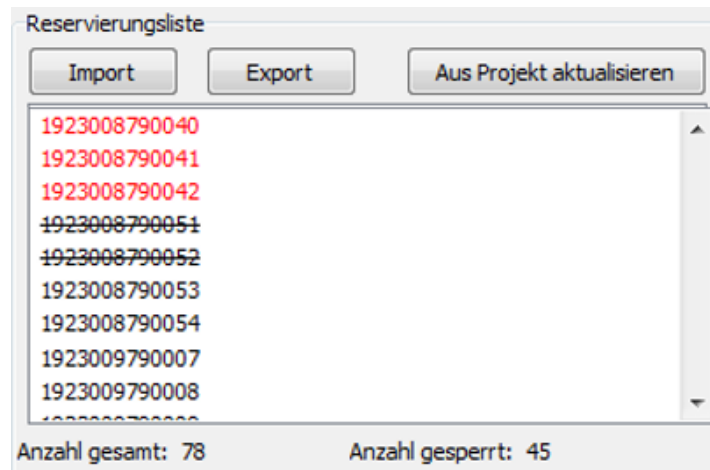
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If you create a *negative list*, the point numbers already assigned in the QL database and thus no longer available in the project are written to the working point number list. They are displayed there in red font.

When generating a *positive list*, a list of available point numbers is generated and displayed in black font in the working point number list by determining the point numbers no longer available in the QL database and setting increments from/to for the component Continuous number of APNR.

Both functions can be combined as desired and called repeatedly. They accumulate corresponding point numbers in the internal reservation list.



Sysged: Mask reservation list working point numbers - APNR of different states

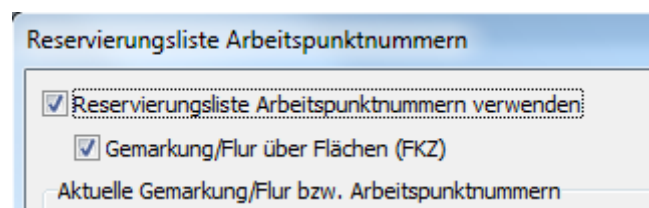
Status einer APNR	Darstellung	Beschreibung
In der QL-Datenbank vergeben	1923008790041	Rote Schrift
Im QL-Projekt vergeben	1923008790051	Schwarze Schrift, durchgestrichen
Zur Vergabe verfügbar	1923008790054	Schwarze Schrift

Table: Values of the Display of Working Point Numbers

With the function *Update from project* a direct comparison with already used point numbers in the project takes place, which are then crossed out in the reservation list.

Working with the Reservation List

The internal reservation list is activated with the switch *Use reservation list working point numbers*.



Sysged: Mask Reservation List Working Point Numbers - Section Switch for Activation

The same can be done via the mask Settings Graphic - Input/Edit Windows.

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Inkrement für Punkt- und System-IDs

Punkt-ID: Start-ID = ☒ Lücken suchen ☐ Alphanumerisch

☐ km² PNR ☒ Reservierungsliste für km²-PNR verwenden

☒ Arbeitspunktnummer aus Reservierungsliste ☒ Gemarkung/Flur über Flächen (FKZ)

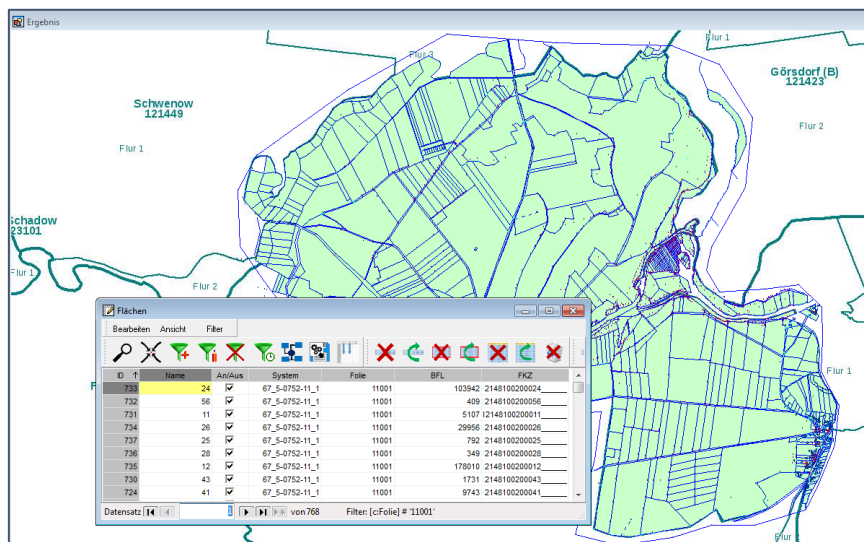
Sysged: Mask Setting Graphic - Input/Edit Windows (excerpt)

Generating working point numbers with the help of ALKIS areas

If ALKIS areas are available across the board, the option *district/field via FKZ* is a convenient support to get a correct preassignment for working point numbers.

☒ Gemarkung/Flur über Flächen (FKZ)

Sysged: Mask Reservation List Working Point Numbers (excerpt) - Switch district/field via FKZ



Sysged: QL project with areas including FKZ - Graphics window Result / Browser Areas with FKZ

In the Result graphics window, the district and field now will determined using the position of the cursor with a background function "Point in polygon". In order now to create a new APNR, just the placeholder and an offset for the consecutive number still have to be specified.

Reservierungsliste Arbeitspunktnummern

☐ Reservierungsliste Arbeitspunktnummern verwenden

☒ Gemarkung/Flur über Flächen (FKZ)

Aktuelle Gemarkung/Flur bzw. Arbeitspunktnummern

Gemarkung	Flur	Platzhalter	Fortlaufende Zahl ab
1441	+ 008	+ X	+ 00001
(4 Zeichen)	(3 Zeichen)	(1 Zeichen)	(5 Stellen)

Sysged: Mask Reservation List Working Point Numbers (excerpt)

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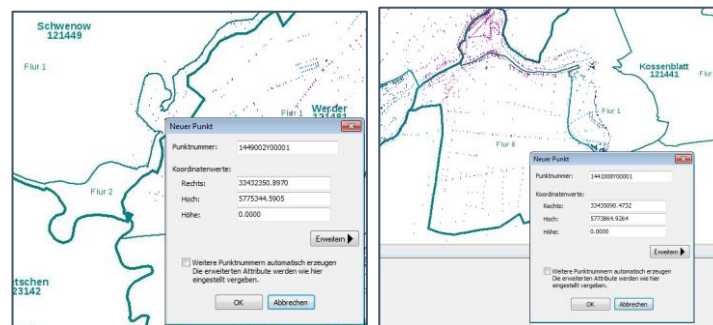
Generating Working Point Numbers with other WMS Utilities

If no ALKIS areas are available for the generation of the automatic offset *GGGGFF*, the entities district and field can be entered interactively as well as placeholder and consecutive number.

Gemarkung	Flur	Platzhalter	Fortlaufende Zahl ab
1449	+ 002	+ Y	+ 00001
(4 Zeichen)	(3 Zeichen)	(1 Zeichen)	(5 Stellen)

Sysged: Mask Reservation List Working Point Numbers (excerpt)

However, district and field information can also be read in the analog or digital field books or more convenient out of a concerning WMS.



Sysged: Reading district and field from a WMS

Provision and allocation of reserved system names

Orthogonal and polar measurements are held together topologically by a system. A system name is assigned to this, which must be unique at least in the current project, in QL procedures but also nationwide.

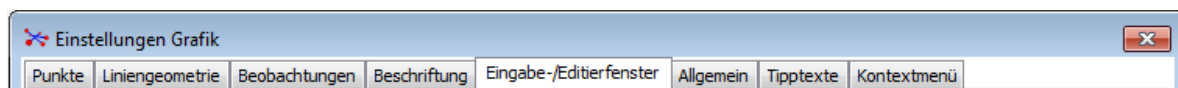
Sysged: Graphic mask for a orthogonal measurement line with system name

There are these variants for assigning system names:

- (0) Individual system names with numeric or alphanumeric increment
- (1) System names according to the QL procedure

Selection of variants (0) or (1):

Switching options are available with the Mask Settings Graphic - Input/Edit Windows.



...

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System-ID für Messungslinien:	Start-ID =	MLI_01	<input checked="" type="checkbox"/> Lücken suchen	<input type="checkbox"/> Alphanumerisch
System-ID für Abstände Punkt-Linie:	Start-ID =	APL_01	<input checked="" type="checkbox"/> Lücken suchen	<input type="checkbox"/> Alphanumerisch
System-ID für Parallelitäten mit Abstand:	Start-ID =	PMA_01	<input checked="" type="checkbox"/> Lücken suchen	<input type="checkbox"/> Alphanumerisch
System-ID für Durchfluchtungen:	Start-ID =	FLU_01	<input checked="" type="checkbox"/> Lücken suchen	<input type="checkbox"/> Alphanumerisch
System-ID für Polarmessungen:	Start-ID =	POL_01	<input checked="" type="checkbox"/> Lücken suchen	<input type="checkbox"/> Alphanumerisch
<input type="checkbox"/> Systemnamen aus Reservierungsliste				

Sysged: Mask Settings Graphic - Input/Edit Windows (Clippings)

(0): Assignment of individual system names

An alphanumeric start ID is set for the various systems, from which the next free names are assigned in ascending order. You can connect to the largest assigned system names or use the *Find gaps* option to fill free names between the start ID and the next largest assigned system name. With the *Alphanumeric* option, you can use both numeric increments (0-9) and alphabetic characters (A-Z, a-z) next to the *Find gaps* option.

(1): Assignment of reserved system names

In the registration notes of a QL procedure, specifications are made for the nationwide uniform assignment of system names in order to guarantee the clear storage in the connected QL database in which the responsible administration of the system names takes place.

Similar to reservation lists for point numbers (APNR, km²-PNR), reservation lists are also used for system names. For system names, its generation takes place in the QL database in the same way as for working point numbers (APNR). External users who do not have access to the QL database are provided with reservation lists from the authority.

Differences between Brandenburg and Mecklenburg-Western Pomerania

Both federal states use the QL procedure. There are minor differences for the assignment of system names, shown in the following table:

Federal state	Structure of the system name
Brandenburg	GGGGFFFTUUUBNN
Mecklenburg-Western Pomerania	GGGGFUUUUUBNNN

Overview of the supported structures in the system name

The meanings of the colored characters are taken from the official rule book of the both states:

Systemnamen: GGGGFFFTUUUBNN			
Stelle	Kürzel	Informationsinhalt	Bemerkung
1-4	G	Gemarkungsschlüssel*	
5-7	F	Flur*	
8	T	Unterlagentyp	
9-11	U	Blattnummer*	
12	B	Beobachtungstyp	
13-14	N	Nummerierung der Systeme*	beginnend mit 1 pro Blatt u. Beobachtungstyp

QL-entry notes for system names in Brandenburg (excerpt)

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Systemnamen: GGGGFFUUUUUBNNN			
Stelle	Kürzel	Informationsinhalt	Bemerkung
1-4	G	Gemarkungsschlüssel	vierstellig
5 - 6	F	Flur	zweistellig
7 - 11	U	Rissnummer	Vergabe entsprechend der landkreisinternen Nummerierung
12	B	Beobachtungstyp	
13 - 15	N	Laufende Systemnummer	durchlaufende Vergabe der Systemnummer für jeden Beobachtungstyp pro Messungssache

QL-entry notes for system names in Mecklenburg-Western Pomerania (excerpt)

The mask *Settings/Reservation List System Names* is very similar to the corresponding screen for working point numbers. Generation of the *field list*, queries in the QL database, export and import of reservation lists as well as working with the internal reservation list are performed in the same manner.

Document type/sheet number (BB) or field book number (MV) and the observation type are further differentiation criteria for the structure of the system name.

Sysged: Mask Reservation List System Names for Brandenburg

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Date: 25.11.2019

Sysged: Mask Reservation List System Names for Mecklenburg-Western Pomerania (excerpt)

This is a summary of used text presentations used in the reservation lists:

Status of a system name	Name display	Description
Assigned in the QL database	1460001F001M01	Red lettering
Assigned in the QL project	1460001F001M02	Black lettering, struck through
Free for assignment	1460001F001M03	Black lettering

Tabelle: Used shapes of the display of system names in the reservation list

Generation of the field list and its further use

The entities of the *Field list* are *District* and *Field*. Those elements can be collected after interactive typing, or they can be generated automatically within a QL project containing ALKIS areas with FKZ identifier. Further the field list can be filled by importing *District* and *Field* from a file.

Sysged: Mask Reservation List System Name with Input boxes and the field list (excerpt)

Sysged: Mask Reservation List System Name with button for automatic field list generation (excerpt)

The field list is used to query system names in the QL database via their selection. Its further use is to set default combinations *District* and *Field* for system name generation. That option can be waived in case of using ALKIS areas with FKZ identifier with automatic district and field recognition.

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Import from the QL Database - Negative and Positive list

With the selection of combinations of district and field from the *field list*, system names are queried in the QL database, whereby *negative lists* and *positive lists* designated will be generated.

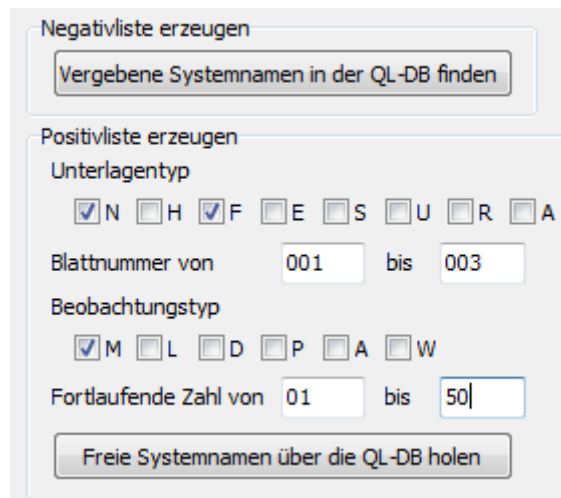
Creating a *negative list* means to find system names which are already assigned in the QL database and thus no longer available in the QL project. They are displayed there in red font, see pictures above.

Creating a *positive list* means to find to create free system names which are not assigned in the QL database and therefore available in the QL project if just not already used there. If the names are frre, they will be written in black font, if used in the project they will be written in crossed-out black font.

The number of system names created using the positive list is calculated using the formula

$$\text{Number of system names} = \text{Sum of District/Field} \times \text{Sum of Document Types} \\ \times \text{Number of sheets} \times \text{Sum of observation type} \times \text{Consecutive number.}$$

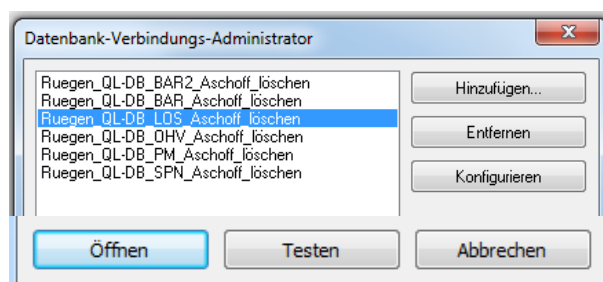
In order not to get too many elements in the *positive list*, the query can be specified with limited field book types, sheet numbers, observation types and consecutive numbers. The function Get Free System Names from QL Database then generates the positive list with system names displayed in black font. It can be repeated with different specifications and accumulates the reservation list subsequently. Comparisons with the system names which are already used in the project lead to numbers in crossed-out black font. That comparison can be done directly with the Update from Project.



Sysged: Mask Reservation List System Names,
Section Import from the QL database
Negative and Positive List (Brandenburg)

Connect the QL Database

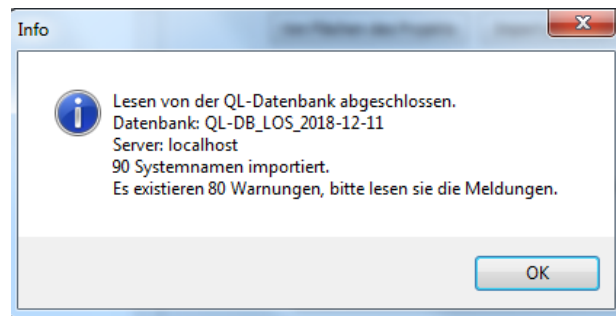
Before the negative or positive list can be created, the QL database must be opened



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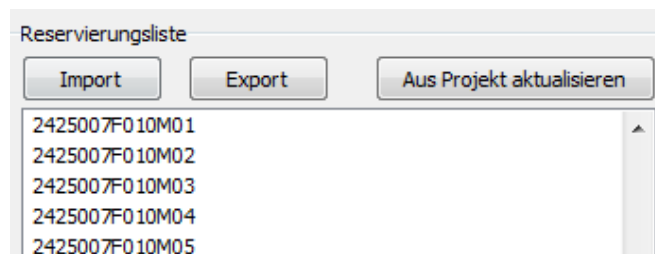
Sysged: Mask for the Selection of a QL database



Sysged: Messages after the import of names from the QL database

Export for an external use of the reservation list

The Export function allows you to export the generated reservation list for external applications which have not an access to the QL database.

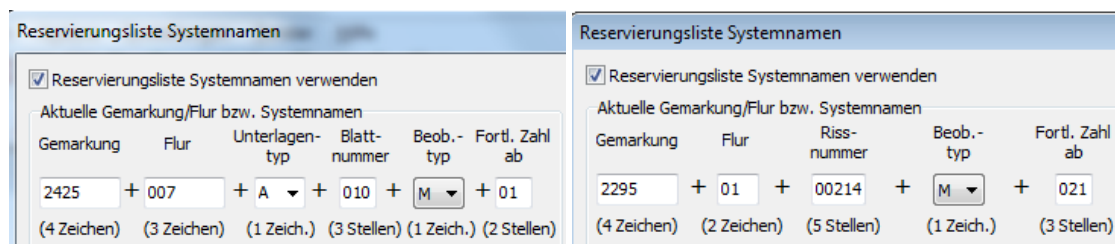


Sysged: Mask of a reservation list (excerpt) – Function Export

An external user of the QL procedure imports this reservation list, which gives him usable system names (positive list). However, he could also get system names to be excluded (negative list).


Working with the reservation list

First, the user decides generally to use the reservation list. There is the option *Use reservation list system names*. Further there are district, field, document type and sheet number (Brandenburg), the observation type and the consecutive number. Those components specify a system name.



*Mask Reservation List System Names - Offset for System Names (excerpts)
(left hand Brandenburg right hand Mecklenburg-Western Pomerania)*

Specify system name components

The field in which the next probable point generation will take place, is usually taken with the the function button  from the *field list*.

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Mask Reservation list system name (excerpt) – System name components

Surely the user can type valid texts for district and field interactively. The other components of the system name (see picture above) have to be typed anyway.

Specify of system name allocation style

Further it has to be decided whether a system name which will be generated according to the above specification this specification, shall be created free or under control of the reservation list. Following the latter option, using negative or positive list are subordinate options.

Mask Reservation list system name (excerpt) – System name allocation style

Mit diesen Einstellungen wird der Systemname **2425007F010M02** einer neuen Messungslinie als erster freier d.h. nicht bereits vergebener Name generiert.

Cross off used system names

After the creation of a system name (here for a measurement line with a component "M") the previously free system name will be "crossed off" in the reservation list and is then no longer available.

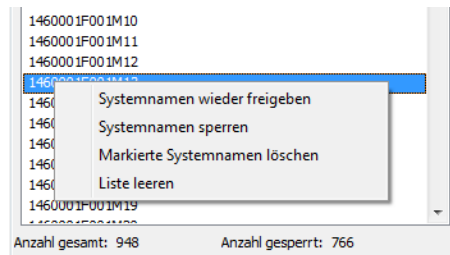
Mask Reservation list system name (excerpt) – Display of crossed off system names

Work inside the reservation list

The reservation list can be edited with functions of its context menu, e.g. lock, unlock, delete names, empty or update the list.

Systra Release 8.0 – Update-Information

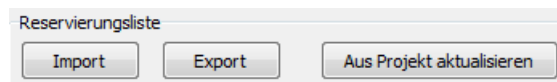
Date: 25.11.2019



Mask Reservation list system name (excerpt) – Context functions inside

Update the reservation list with project information

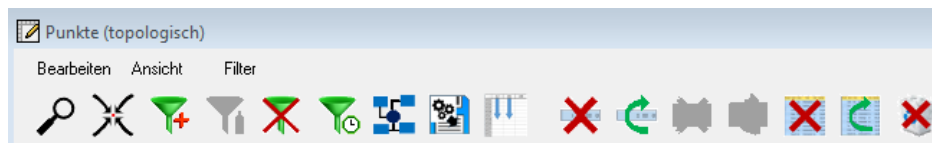
The *Update from project* function checks the processing measures in the project and updates the reservation list. E.g. the settings of free or assigned system names from the QL database that have been deleted from the reservation list can be restored again.




Mask Reservation list system name (excerpt) – Update from project function


2.1.11 2019: Updating the filter browsers

The browser functionality Update Filter has been revised.



Sysged: Standard toolbar of a browser

The function is still called in the menu *Filter* with function *Update filter* or with the symbol . Previously, the update only had a reducing effect, means it reduced the number of data records if changes were made due to the filter criteria with its active change in other browsers or the graphic. The developments include the following:

- The update of the filter now has also a complementary effect and increases the number of records in the filter browser, if the filter criteria are fulfilled for further records, which are changed in other browsers or the graphic.
- The filter is updated automatically if the changes are made via other browsers, other filter browsers or the graphic.
- Only in the active filter browser itself, the update still takes place interactive by intention with the existing function call *Update filter* or symbol  when changes have been done there.

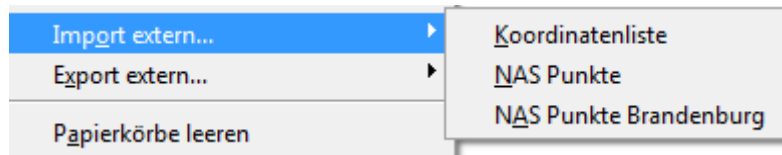
2.1.12 2019: Import NAS Points

The function *Import extern/NAS points Brandenburg* which is specified for the state of Brandenburg was adapted in 2019 with respect to the Substitution of the attributes KQU and KER.

The ALKIS compliant function *Import external/NAS points* remained unchanged.

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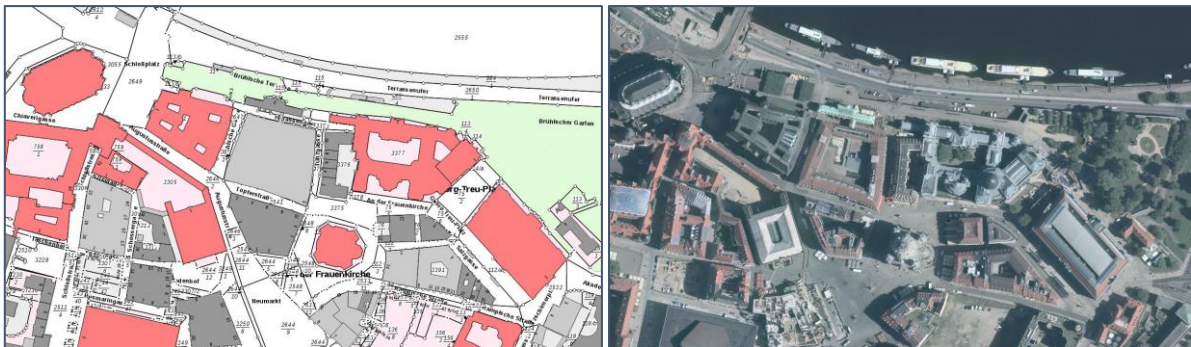
Date: 25.11.2019



Sysged: Optional function for Import NAS points

2.1.13 2019: WMS with transport encryption TLS instead of SSL

With the conversion to the newer TLS encryption protocol, the WMS (Web Map Services) can now also be displayed in the graphic in the federal state of Saxony. There are no restrictions for federal states that still use SSL.



Sysged: WMS ALKIS und DOP20 im Bundesland Sachsen

Hints from the Internet

SSL (Secure Sockets Layer) and TLS (Transport Layer Security) are both encryption protocols that provide authentication and data encryption between servers, computers, and applications operating on a network (e.g., a client connecting to a Web server). SSL is the forerunner of TLS.

2.1.14 2018: Connection of Web Map Services

WMS are important within the QL process.

Concerning the project database:

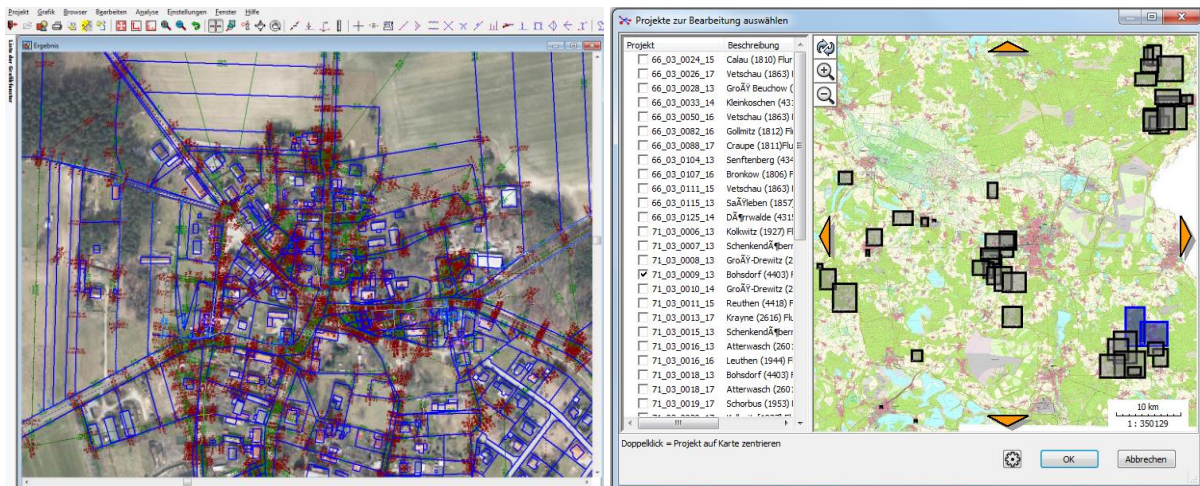
- ◇ Comparison of position changes (QL procedure ⇔ ALKIS),
- ◇ Assignment of parcels (survey elevation ⇔ ALKIS),
- ◇ Actuality check of buildings (survey elevation ⇔ digital ortho photos).

Concerning the QL database:

- ◇ Project overviews (TK25 or smaller scale, depending on the area size),
- ◇ Measurement data information requests to the QL database,
- ◇ Taking measurements from the QL database.

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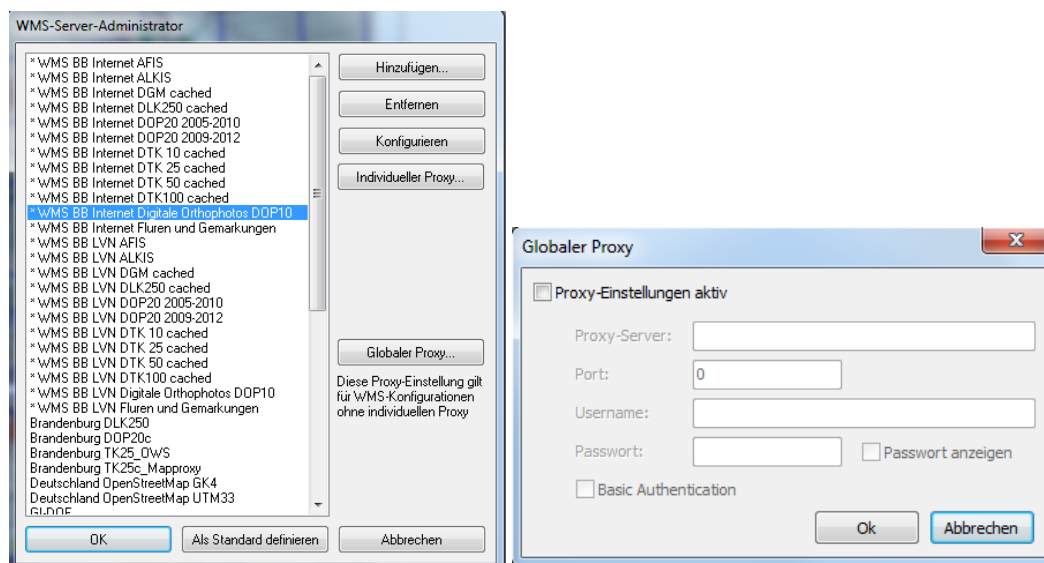
Date: 25.11.2019



WMS (here DOP10) in the Systra project database

WMS (here TK25) in the QL database

The WMS are subject to permanent maintenance and settings at the WMS providers. For some proxy server settings (globally or individually for selected WMS), the administrator mask has been extended. The available WMS have been adapted and extended.



Mask for setting WMS, global and individual proxy settings

2.1.15 2018: Complete Area Transfer

The transfer of ALKIS areas (at least parcels and buildings are transported) to the QL procedure is used for a QL area comparison between imported book areas and current areas due to new coordinates of the QL analysis.

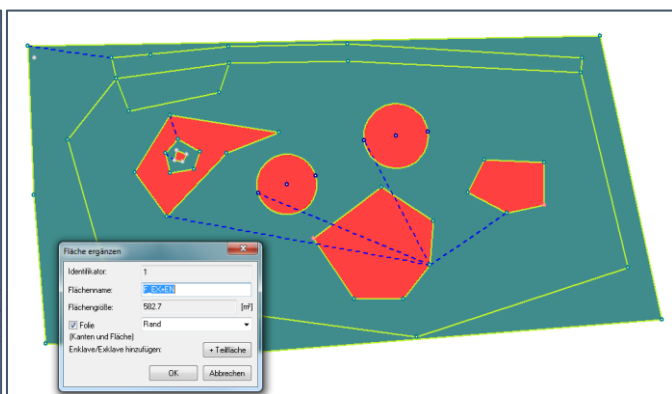
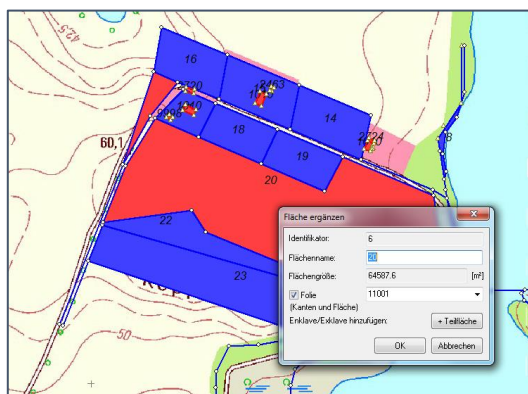
In order to capture all possible surfaces, adjustments and enhancements were made during import, administration, display and export. You can now read surfaces with the line type edge, arc and snap line. With these, in turn, surfaces with enclaves and exclaves can be taken into account in a variety of combinations.

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Sysged: Representation of imported ALKIS surfaces with bounding edges and circular arcs



Sysged: Darstellung von Flächen mit Enklaven und Exklaven

2.1.16 2018: QL Area Comparison

This function was already released with the base installation at the end of 2016. It has been maintained since then as described in the following.

Transfer of Areas to the Systra Project Database

The QL surroundings is performed for all areas imported through the Systra LIN and FAT files. The Systra input file <project name> .FAT for area attributes reads the ALKIS attributes Area code FKZ and Book area BFL.

954	BFL	320
954	FKZ	12452800202276
954	FOLIE	11001
954	NAME	2276
954	SYSTEM	12_34_5678_90_1
955	BFL	106
955	FKZ	12452800201609
955	FOLIE	11001
955	NAME	1609
955	SYSTEM	12_34_5678_90_1

Systra input file <projec name>.FAT (extract)

The contents of the FAT file are linked to block 4 "areas" of the Systra input file <project name>.LIN, in which the polygon consisting of points and surrounding the area is stored. The linking element is a temporary area key (in this case the key numbers 954 and 955 for the two areas shown) that is standing in both files. The area name (formerly parcel or house number), however, is a potentially ambiguous information. The area name is also part of the ALKIS area code FKZ.

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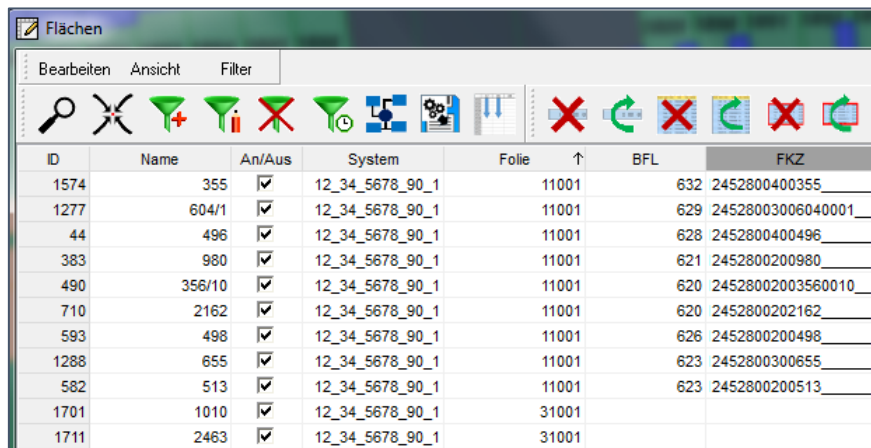
954334085821206304334085821206300	12_34_5678_90_1	11001	2276	0
954334085821206305334085821206304	12_34_5678_90_1	11001	2276	0
954334085821206306334085821206305	12_34_5678_90_1	11001	2276	0
954334085821206307334085821206306	12_34_5678_90_1	11001	2276	0
954334085821206308334085821206307	12_34_5678_90_1	11001	2276	0
954334085821206308334085821206298	12_34_5678_90_1	11001	2276	0
954334085821206299334085821206298	12_34_5678_90_1	11001	2276	0
954334085821206300334085821206299	12_34_5678_90_1	11001	2276	0
955334085821203018334085821203017	12_34_5678_90_1	11001	1609	0
955334085821203027334085821203017	12_34_5678_90_1	11001	1609	0
955334085821203027334085821203026	12_34_5678_90_1	11001	1609	0
955334085821203026334085821203018	12_34_5678_90_1	11001	1609	0

Block 4 „Areas“ of the Systra input Eingabedatei <project name>.LIN (extract)

The graphical representation of area names (for example, the parcel number) is also possible if only the LIN file is read.

Comparison of book surfaces and arithmetic surfaces with statistical analysis

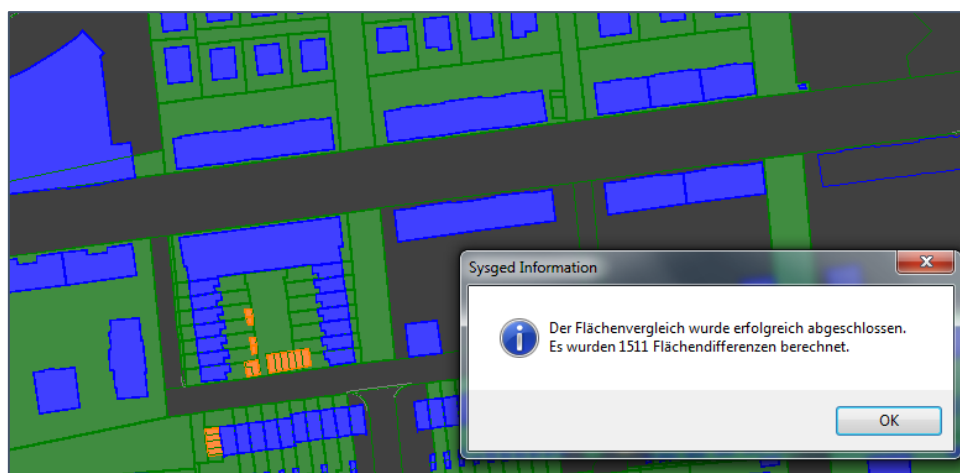
The area comparison is carried out for areas which have the area code FKZ and the book area BFL.



ID	Name	An/Aus	System	Folie	BFL	FKZ
1574	355	✓	12_34_5678_90_1	11001	632	2452800400355
1277	604/1	✓	12_34_5678_90_1	11001	629	24528003006040001
44	496	✓	12_34_5678_90_1	11001	628	2452800400496
383	980	✓	12_34_5678_90_1	11001	621	2452800200980
490	356/10	✓	12_34_5678_90_1	11001	620	24528002003560010
710	2162	✓	12_34_5678_90_1	11001	620	2452800202162
593	498	✓	12_34_5678_90_1	11001	626	2452800200498
1288	655	✓	12_34_5678_90_1	11001	623	2452800300655
582	513	✓	12_34_5678_90_1	11001	623	2452800200513
1701	1010	✓	12_34_5678_90_1	31001		
1711	2463	✓	12_34_5678_90_1	31001		

Sysged: Browser surfaces with FKZ and BFL for parcels

The function is started with the menu item **Edit / Perform QL area comparison**.



Sysged: Result message of the QL area comparison

The result is displayed via a surface browser with the parameters *Difference [%]* and *Significance [.]*. The significance is based on the standard deviations of the surfaces, which are calculated by means of error propagation over the standard deviations of the points before or after the adjustment.

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Bearbeiten Ansicht											
Nr	Flid	Name	Flurstückskennzeichen	amtl. Fl[m2]	red. Fl[m2]	Diff[m2]	Diff[%]	SigmaFL[m2]	Signifikanz		
4	11	2641	2452800202641	1.0	1.5	-0	46***	0.1	5.3***		
5	1131	2060	2452800202060	1.0	0.4	1	59***	0.1	4.9***		
6	347	1686	2452800201686	1.0	0.7	0	34***	0.1	4.8***		
7	8	2643	2452800202643	6.0	5.6	0	7	0.1	3.4***		
8	836	2030	2452800202030	513.0	509.8	3	1	1.0	3.3***		
9	838	2031	2452800202031	511.0	507.9	3	1	1.0	3.2***		

Datensatz: 1 von 1511

Sysged: Result of the area comparison

2.1.17 2018: Treatment of Graphic Arcs with Vertices

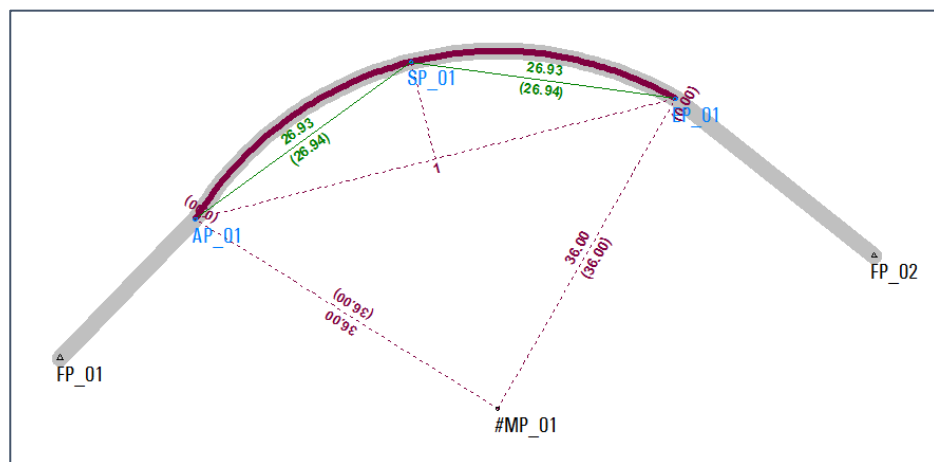
In order to maintain circular arc transitions (circular arc / edge or circular arc / circular arc), Systra expects the center point of a circular arc. In ALKIS, however, the vertex (bow center point) is managed and consequently transferred to Systra from partner programs via Systra Input files.

In order to guarantee an exact geometric midpoint of the returned graphic arc, internal measures are implemented at Sysged and Systra, as follows.

When importing an arc with midpoint of the bow, Sysged automatically generates an artificially measured arc with an artificial arc center point and an artificial radius as an adjustable observation.

Additionally, a distance equation is introduced, which shall hold the vertex in the middle of the arc.

In the example, two weakly weighted distances are the optical control of this distance equation.

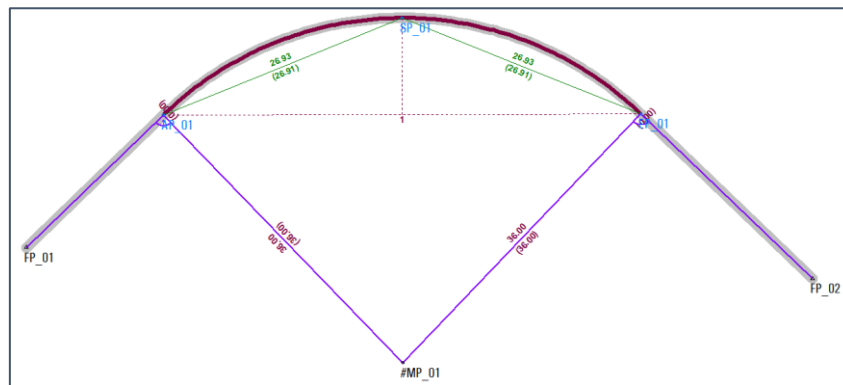


Sysplan: Adjusted circular arc with artificially created center point and artificially created radius

Optionally, the user sets geometric conditions for tangential transitions. In the example, we have right angle conditions for the transition between circular arc and edges, which will be integrated in the adjustment.

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Sysplan: Result of the adjustment of a circular arc with tangential transitions

The result of the Systra adjustment shows compliance with the requirements. Due to the artificial radius, the internal distance condition and the additional rectangle conditions, the arc length changes, but the distances to the end points of the arc remain the same.

Data Transfer back to ALKIS

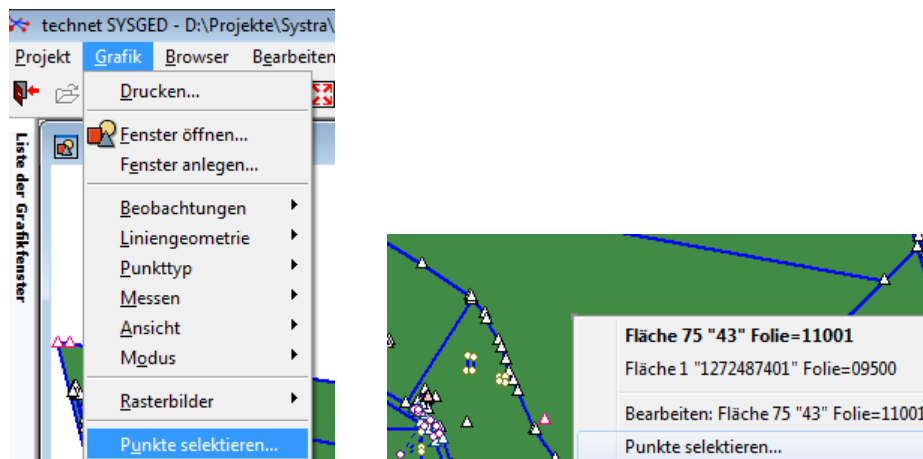
The original coordinates are exchanged by the adjusted coordinates of the vertex and taken on the usual way back to ALKIS.

Transfer to the QL Database

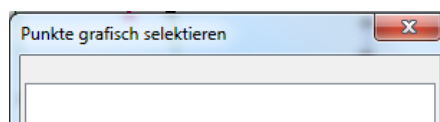
On the other hand, the artificial center point will be removed. This is ensured by its "#" marking during the topological check for the QL database. Consequently, the artificially measured radius has no chance of finding an unauthorized way into the QL database.

2.1.18 2018: Graphical Selection of Points

The function is started with the menu item **Graphics / Select points**. It can also be called up in the context menu (right mouse button) in graphical windows when the graphics window is open.



Sysged: Function calls for the graphic selection of points



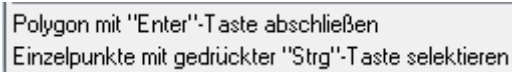
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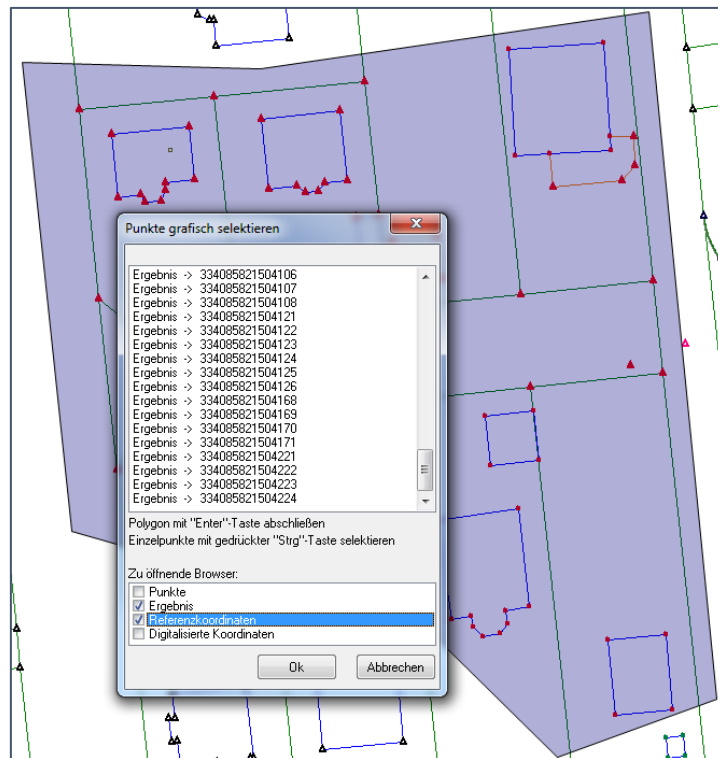


Sysged: Select mask points graphically

The collecting selection is made by the graphic indication of a polygon or a graphic individual indication of points.



Sysged: Select mask points graphically - Info text for options

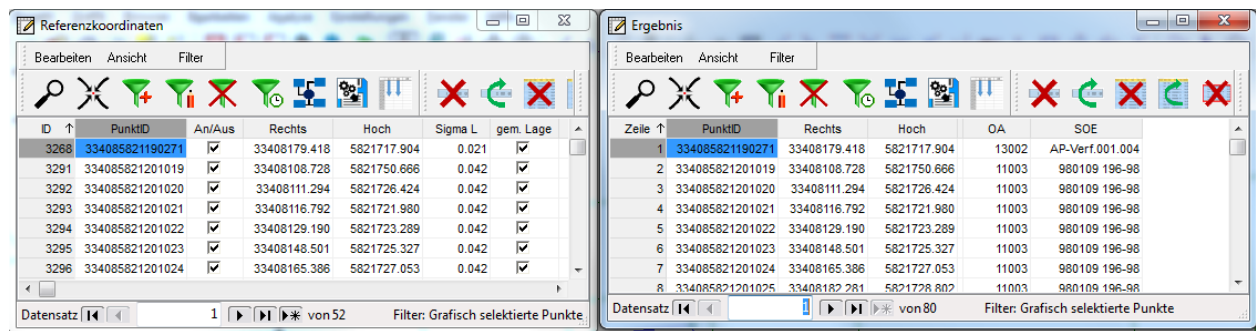


*Sysged: Select points graphically via polygon
Display of the points in the selection mask*

After specifying windows in which to display the selection, filter browsers will be opened, allowing mass edits.

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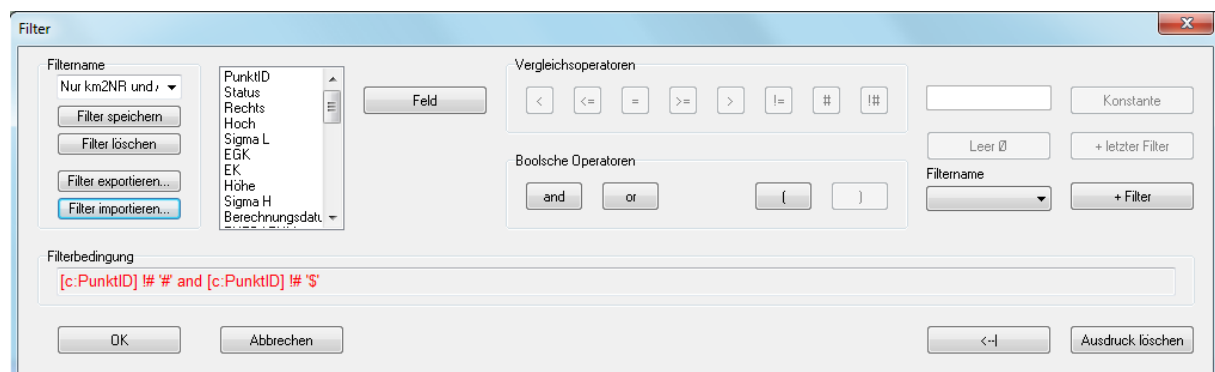
Sysged: Filter browsers of graphically selected points

2.1.19 2018: Across Project Application of Browser Filter Settings

The opportunities for filtering in browsers (table windows) have been extended.

In the *Filter* mask on the left side under *Filter name*, there are function buttons to use filters with general meaning beyond the project.

- ⇒ Save and delete filters
- ⇒ Export and import filters



Sysged: Mask Filter - Use a globally saved filter

Constant EMPTY

As a constant (see mask right top), the value *Empty* can now be incorporated into a filter condition.

Function Buttons for Filtering

Since a certain time essential functions, which were previously only started via menu items, can be clicked with function buttons.



Sysged: Function buttons in the browsers (excerpt)

Button				
Function	Set Filter	Edit Filter	Delete Filter	Update Filter

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Set filter / Edit filter

The function *Set filter* already exists for some time, it is now to be interpreted as a *New filter*. With the new function *Edit Filter*, an existing filter can be extended or changed.

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In both cases, the active filter condition can be edited individually and exported across projects to the file *Sysged.Filter*.

Sysged: Export Active Filter Condition to Global Memory

Sysged: Name new filter condition in global memory

Conversely, a filter condition stored there can be imported into the project.

Sysged: Set filter condition - here imported from global memory

Sysged: Import filter condition

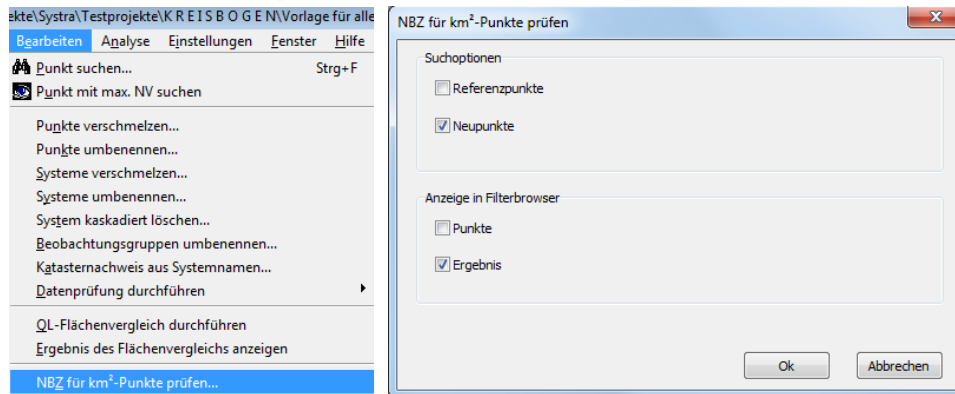
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2.1.20 2018: Exam NBZ for Points with km² Numbering

The new function checks whether the position coordinates of a point with km² numbering (official German cadaster point numbering) still fit its naming convention. The coordinates could have slipped out of the original kilometer square by the QL adjustment.

The checking mass function is called up via the menu item *Edit/Check NBZ for km² points...*

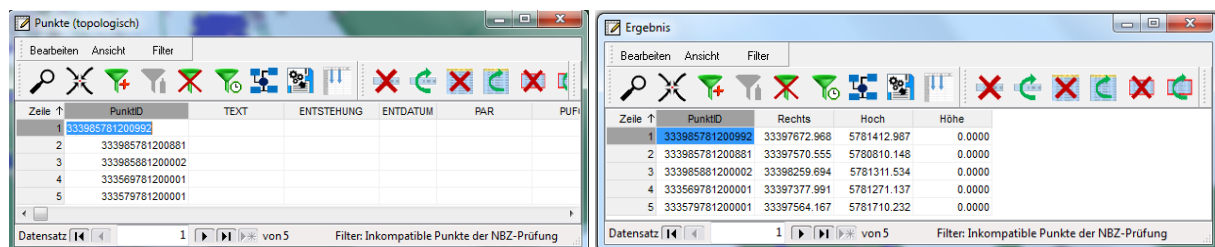


Sysged: Menu item Edit / Check NBZ for km² points ... Edit mask / Check NBZ for km² points

The function mask was simplified in the second half of 2018, it is available for

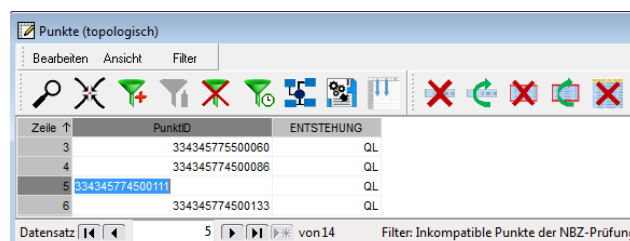
- ◇ Search options: Filtering for reference points and/or new points
- ◇ Display: In the browsers points and/or result

The result of the check is the display of incompatible point numbers. The output is done in selectable filter browsers.



Sysged: Filterbrowser Points with incompatible points Sysged: Filterbrowser Result with incompatible points

Of course, you might use the browser *Points* to change the km² point number directly without program control. However, this is not a useful consequence with respect to the NBZ check result.



Sysged: Interactive change of incompatible km² PNR in the filter browser Points

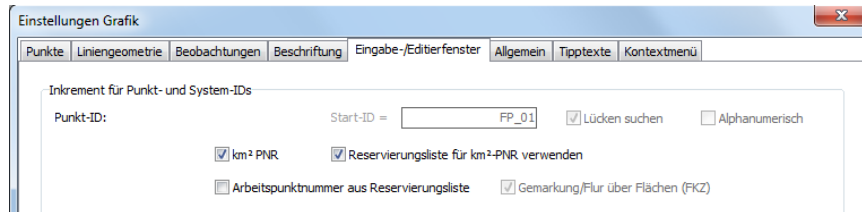
Much better, the browser *Result* can be used to assign correct and reserved km² point numbers to these incorrect points, see chapter Qualified renumbering into km² point numbers.

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2.1.21 2018: Qualified renumbering into km² Point Numbers

In order to get the functionality available, firstly activate the km²-PNR assignment at all and the belonging km²-PNR reservation list additionally, to be done under *Settings Graphics/Input/Edit Windows*.



Mask Settings Graphic - Input/Edit Windows (excerpt)

The the function can be used

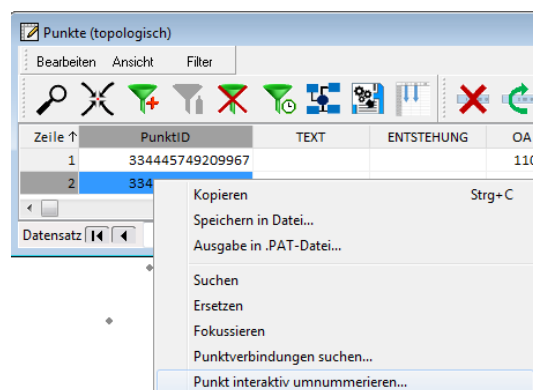
- (a) in case of km² PNR incompatibility with its coordinates or
- (b) in case of a change need for any point number, e.g. a working point number.

In both cases, the renumbering can be done interactively or as a mass action.

Interaktive Renumbering

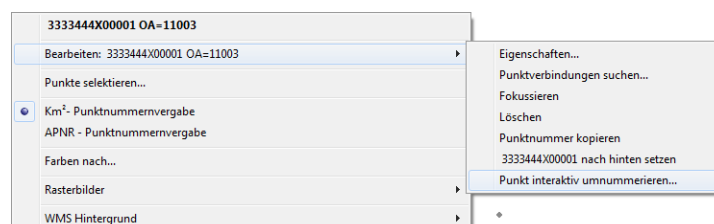
The action can be done in the Browser *Points* or in the Graphic. The related function *Interactive point renumbering...* will be started with the cursor

1. Browser Points:
...on the point dataset and using the *Edit* menu or the context menu.



Sysged: Select function from browser points

2. Graphic
...on the point symbol, using the graphic context menu with its submenu *Edit <point>*.



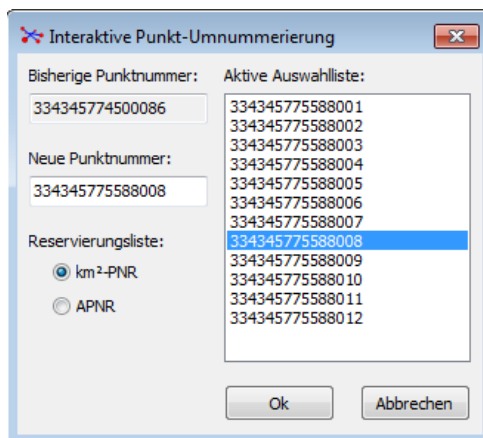
Sysged: Select function from the graphic

Then you get the mask *Interactive Point renumbering* started.

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Next to the point number of the selected point, the available km² point numbers of the suitable kilometer square based on global UTM coordinates are displayed. One of the available points can be chosen. The renumbering can be operated on points with incompatible km² point numbers, working point numbers or any other point numbers.



Sysged: Interactive point renumbering

Note: Functionality has been extended to target point numbers from the the reservation list of working point numbers. Of course, this functionality needs available ALKIS area data in the setting APNR reservation list next to the “FKZ piecing method” switched on.

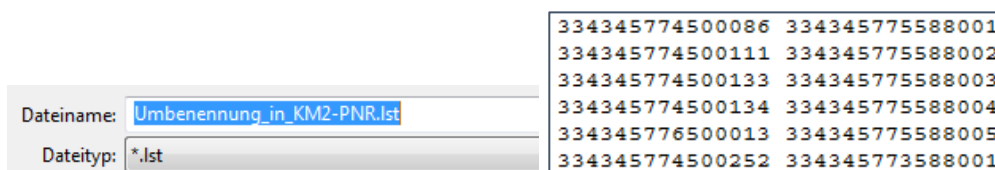


Sysged: Mask Settings Graphic / Input-/Edit Windows(excerpt)

Mass Renumbering

The action can be done in the Browser *Result only*. The related function *Create renumbering list km²-PNR...* will be started from the menu Edit or from the browser context menu.

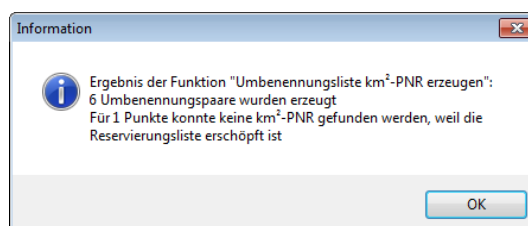
A renumbering list is created by giving the name of a renumbering list file. Content of the file are the incompatible km² PNR left and compatible km² point numbers from the reservation list fitting to the UTM coordinates of the origin point by kilometer square.



Sysged: Selection of a filename

Content of a renumbering list

When executing the function, a message showing the results is written. With respect to an exhaustion of the reservation list concerning available point numbers warnings are written additionally.



Sysged: Messages on the allocation or non-allocation of reserved km²-PNR

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Note: Mass functionality for creating compatible working point numbers (APNR) would be possible with the preconditions as written above. However, it is not needed in the QL method and therefore not implemented.

The final renumbering step is done with the general mass function *Rename Points...* in the global menu *Edit* to be started separately. The created renumbering list is taken and transcribed.

2.1.22 2018: Selection of ALKIS Point Attributes

The list of available ALKIS point attributes has been extended in order to provide them flexibly in the states of Brandenburg (BB), Mecklenburg-Western Pomerania (MV) and Saxony (SN). These countries occasionally use attribute abbreviations which do not correspond to the ALKIS standard. You can add these special attributes from a separate selection area to the default attributes.

Available non-geometric point attributes

The following table shows non-geometric point attributes available in Sysged. They are added to the display of a selection group for the mask-controlled composition. In addition, an individual compilation of the attributes to be displayed can be made, which is clipped by the USER group.

Kürzel	Attribut-Beschreibung	Typ	Länge	Gruppe	Verwendung
OA	Objektart	Integer	5	ALKIS	BB, MV
ABM	Abmarkung	Integer	4	ALKIS	BB, MV
BZA	Bemerkung zur Abmarkung	Integer	4	ALKIS	BB, MV
SOE	Sonstige Eigenschaften	Text	25	ALKIS	BB, MV
KER	Koordinaten-Entstehungsart	Bool	1	BB	BB
KQU	Koordinaten-Bestimmung	Integer	4	BB	BB, MV
GST	Genauigkeitsstufe	Integer	4	ALKIS	BB, MV
LZK	Lagezuverlässigkeit	Bool	1	ALKIS	BB, MV
IND	Indirekte Abmarkung	Integer	15	ALKIS	BB, MV
ENT	Entstehung	Text	25	---	BB, MV
TEXT	Beschreibender Text	Text	25	---	BB, MV
ZDE	Zeitpunkt der Entstehung	Text	25	ALKIS	MV
QLQ	Qualifizierung	Bool	1	MV	MV
VWL	Vertrauenswürdigkeit	Integer	4	ALKIS	MV
KDS	Kartendarstellung	Bool	1	ALKIS	---
KST	Koordinatenstatus	Integer	4	ALKIS	--
FGP	Festgestellter Grenzpunkt	Bool	1	ALKIS	---

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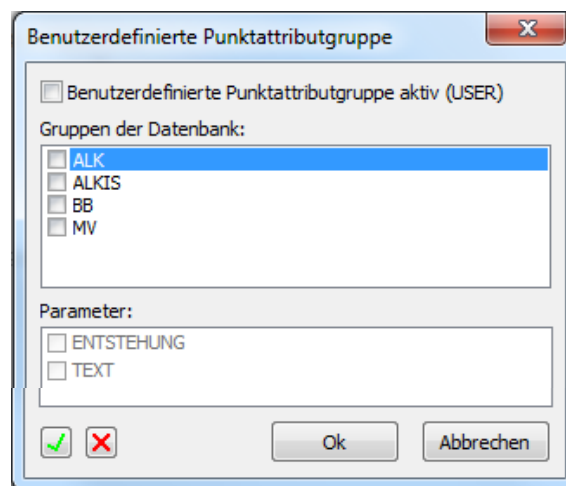
DES	Description (KQU, DPL)	Integer	4	ALKIS	---
PAR	Punktart	Text	4	ALK	---
VMA	Vermarktungsart	Text	3	ALK	---
SYM	Symbol	Text	4	ALK	---
PuFolie	Punktfolie	Text	15	ALK	---

Table of ALKIS point attributes supported by Sysged

The selection group ALK will be offered until further notice as long as users want to transfer QL projects from ALK times to ALKIS and make comparisons between corresponding ALK and ALKIS attributes.

Definition of a Custom Point Attribute Group

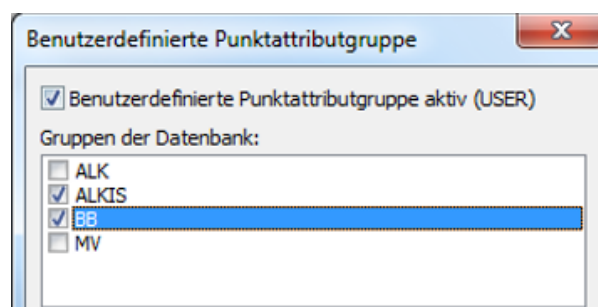
The function is started under *Settings / Custom point attribute group...*. By activating the higher-level USER group switch, the selection of the attributes is enabled via the previous specification of the selection groups.



Sysged: Mask Custom point attribute group

Without switching a selection group, you can see the general attributes **Text** and **Creation** that do not belong to a selection group.

In order to be able to make a selection, all the desired selection groups are initially activated, in the example for the state of Brandenburg.

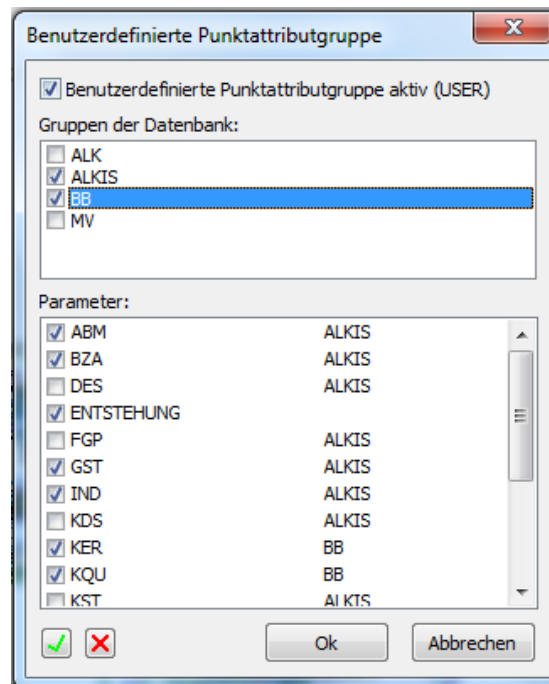


Sysged: Cycle of attribute selection groups

From the now available offer, the attributes are selected in accordance with the QL Guide.

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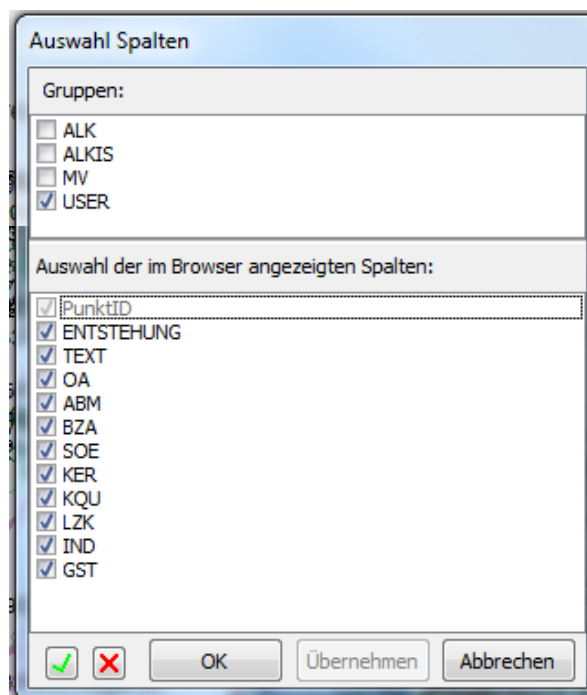
Date: 25.11.2019



*Sysged: cycle of desired attributes
in mask custom point attribute group*

Display the Elements of the Custom Point Attribute Group

Now you have to select the display of the USER group for *Browser* and *Graphics*. In the browser, the USER group is selected in the mask selection mask.



Sysged: Mask Column Selection for browsers

With column selection, individual adaptations can still be made to the displays in the current browser, e.g. the switching off temporarily not meaningful columns.

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Punkte (topologisch)

Bearbeiten Ansicht Filter

Zeile ↑	PunktID	ENTSTEHUNG	TEXT	OA	ABM	BZA	SOE	KER	KQU	LZK	IND	GST
1	2448002X00031	5-0597-17HQL	fehlender KP, ZF	11003	1713			✓	4100			
2	2448002X00034	5-0597-17HQL	fehlender KP, ZF	11003	1713			✓	4100			
3	2448002X00035	5-0597-17HQL	fehlender KP, ZF	11003	1713			✓	4100			
4	2448002X00078	5-0597-17HQL	fehlender KP, ZF	11003	9500	4000		✓	4100			
5	2448006X00005	5-0597-17HQL	fehlender KP, ZF	11003	1000	4000		✓	4100			
6	2448006X00193			31005	1000		5-1566-09	✓	4200			

Datensatz: 1 von 1107 Filter: [n:OA] != 0 and [n:ABM] != 0 and [n:OA] != 0 and [n:ABM] != 0

Sysged: Browser Points - display the attributes of the USER group

In the Graphic, the USER group is selected in the *Point Properties* mask.

Punkteigenschaften

Punkt-ID: 334235799500754 Verkleinern

System: Ergebnis

Punkt-Typ: Grafischer Referenzpunkt

Rechts: 33423382.530 Sigma Lage - SL(v): 0.0000 [m] ✓

Hoch: 5799827.930 Sigma Lage - SL(n): 0.0000 [m]

Höhe: 50.000 Sigma Höhe - SH(v): 0.0000 [m] ✓

Sigma Höhe - SH(n): 0.0000 [m]

Verbunden mit:

- ▾ Grafische Kanten
- 3895
- 3896

Herkunft:

Ergebnis
67_5-0597-17_2
ReferenzKoo_01

Punktattributgruppen (Sichtbarkeit)

- ✓ USER
- ALK
- ALKIS
- BB

Punktattribute

- ENTSTEHUNG
- TEXT
- ✓ OA 31005
- ABM
- BZA
- SOE
- ✓ KER Ja
- ✓ KQU 2000
- LZK
- IND
- GST

OK Abbrechen Ansicht als Standard speichern...

Sysged: Graphic Point Properties - Display of the attributes of the USER group

It should be noted that in this mask, the display of the point attributes follows a parent rule. In the context of point attributes, ranges of values are only visible for the explicitly checked point attributes and thus the input is supported.

Punktattribute

- ENTSTEHUNG
- TEXT
- ✓ OA 31005
- ABM
- BZA
- SOE
- ✓ KER Ja
- ✓ KQU 2000

→

Punktattribute

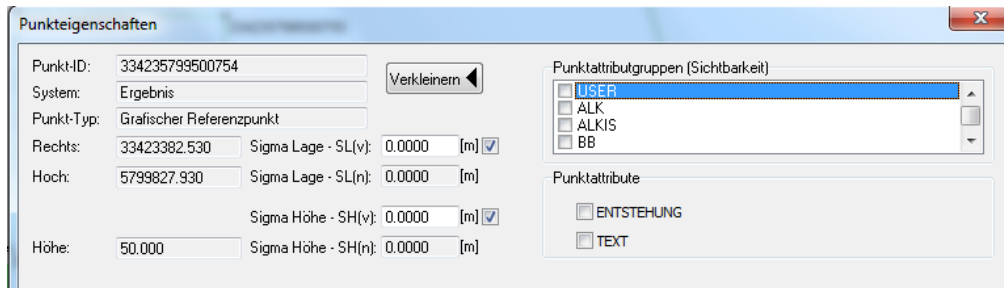
- ENTSTEHUNG
- TEXT
- ✓ OA 31005
- ✓ ABM 1000
- ✓ BZA 4000
- ✓ SOE
- ✓ KER Ja
- ✓ KQU 2000

Sysged: Create the individual visibility and input values

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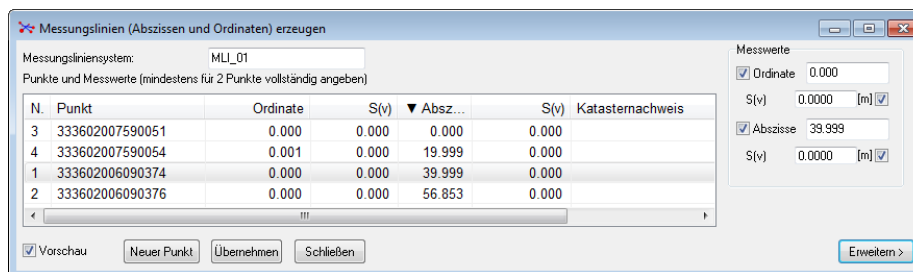
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Switching off the USER group suppresses the display of all elements of this group.



Sysged: Turn on visibility for all members of the USER group

2.1.23 2018: Graphical Input Mask for Measurement Lines – Sorting



Sysged: Mask measurement lines - sorting in the integrated browser

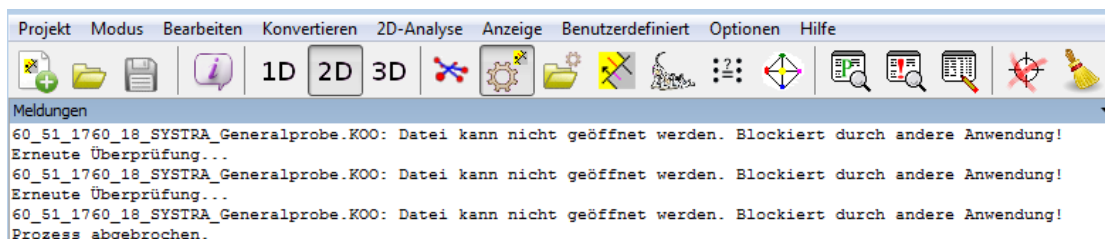
2.2 SystraShell – Project Organisation

2.2.1 2019: Checking the Sysged+Systra sequence in the Analysis Cycle

In the analysis cycle, these program steps are carried out again and again:

- (1) Sysged generates *Systra input files* (function *Export Systra*) and
- (2) SystraShell starts the Adjustment by reading the *Systra input files*.

Formerly, if (2) is started before (1) has finished, the program could crash at (2). The sequence (1) + (2) is now checked by SystraShell. Collisions lead to a controlled abort with warnings.



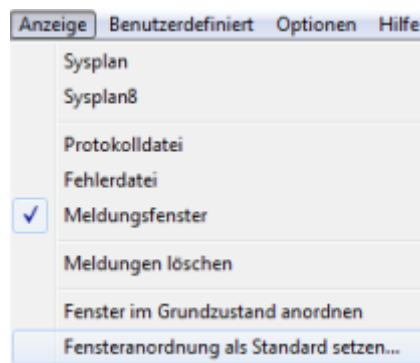
SystraShell: Message window - Warnings when starting the adjustment too early – Cancellation

2.2.2 2019: Set window arrangement as default

In the menu *Display*, the function *Set window arrangement as default...* function can be used to declare the current window arrangement as the default state. The measure must be confirmed.

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SystraShell: Menu Display

This basic state can thus be retrieved for window arrangements in other projects. The function *Arrange windows in default state* is available in the same menu.

2.2.3 2019: Remembering the size of the program window

The size of the program window is saved in the project path for the next opening of the project.

2.2.4 2019: Project selection in slow networks

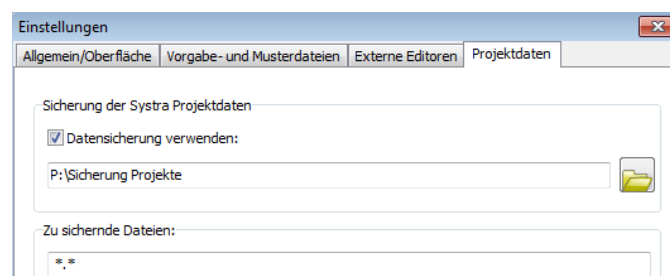
The handling of the dialog *Select Project Path* has been improved for operation in slow network drives.

2.2.5 2018: Project / Save/Fetch

For efficiency reasons, with the function *Save/Fetch*, projects can be kept on a fast storage medium (e.g. a local optical disk), saved centrally (e.g. on a server) and (e.g. at resuming of the project work) taken again from this central storage by pressing a button.

Settings

This function is activated under *Settings / Project data*.



SystraShell: Mask Settings / Project Data

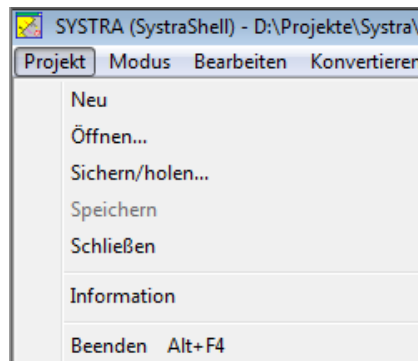
There, the function is activated, the central backup path and the data to be backed up are determined. The data to be backed up does not necessarily have to be all the files of the project path.

Execution

After activation, the function is available via menu item *Project / Save/Fetch...*

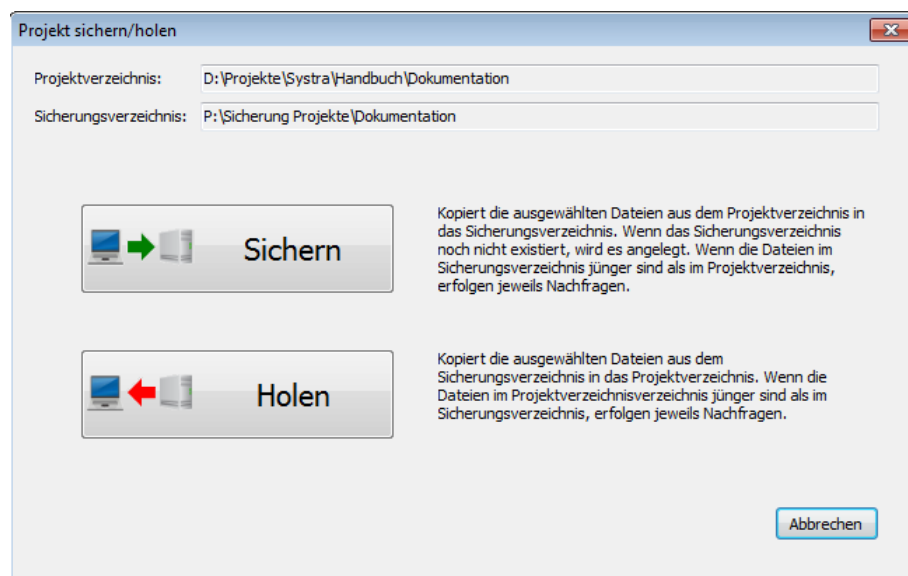
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SysraShell: Project / Save/Get...

With the call above the mask *Project Save/Fetch* will be opened.



SysraShell: Mask Project Save/Fetch

Behind the titles project directory and backup directory, the paths for bidirectional data transport are displayed. The large function buttons Backup and Fetch described in excerpt start the respective direction of the data transport.

- Save the defined project data to the central data store
- Get all saved project data from the central data store

The execution of both functions is subject to plausibility checks. Older project data must not overwrite younger backup data when saving. Similarly, older backup data may not overwrite younger project data when fetching.

2.2.6 2018: Control parameters for circular arc – vertex

New control parameters in the arc are

- ◇ Switch for the internal vertex observations
- ◇ Standard deviation for the internal vertex observations

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The screenshot shows two panels from the SystraShell software. The left panel, titled 'Sonderschalter', contains five checkboxes: 'Lokale Hilfskoordinaten', 'Freie Netzausgleichung', 'Null-Ordinaten separat', 'Alle Null-Ordinaten gleich', and 'Kreisbogen-Scheitelpunkte'. The 'Kreisbogen-Scheitelpunkte' checkbox is checked. The right panel, titled 'Kreisbögen', contains six input fields with units in [cm]: 'Radius' (2.0), 'Pfeilhöhe' (2.0), 'Zentriwinkel' (2.0), 'Peripheriepunkte' (2.0), 'Peripherieendpunkte' (0.2), and 'Scheitelpunkte' (100.0).

SystraShell: Switch (left image) and standard deviation (right image) for vertexes in circular arcs

2.2.7 2018: Control parameters for separate treatment of zero ordinates

The following control parameters refer to the separate treatment of zero ordinates.

The screenshot shows a dialog box titled 'Steuerparameter' with a close button (X). It has two tabs: 'Ausgabe allgemein' and 'Steuerung Beobachtungen'. The 'Steuerung Beobachtungen' tab is selected.

SystraShell: Mask control observations (excerpt)

The screenshot shows a dialog box titled 'Standardabweichungen'. It contains several input fields with units in [cm] or [cm/km]: 'Abszissen' (2.), 'Ordinaten' (2.), 'Null-Ordinaten' (0.01), 'Maßstäbe Absz./Ord.' (15.), 'Digitalisierte Koordinaten' (5), and 'Maßstäbe Dig. Koordinaten' (100). The 'Null-Ordinaten' field is highlighted with a green border. To the left, there is a 'Sonderschalter' panel with five checkboxes: 'Lokale Hilfskoordinaten', 'Freie Netzausgleichung', 'Null-Ordinaten separat', 'Alle Null-Ordinaten gleich', and 'Kreisbogen-Scheitelpunkte'. The 'Null-Ordinaten separat' and 'Alle Null-Ordinaten gleich' checkboxes are highlighted with a green border.

SystraShell: Control parameter for zero ordinates in the control mask

Switch Zero Ordinates separately

The separate treatment of zero ordinates is activated with this switch.

Standard Deviation Zero Ordinates

When the separate treatment is activated, zero ordinates that did not receive an individual standard deviation are assigned the global standard deviation.

All Zero Ordinates equal

Individual zeros of zero ordinates are replaced by activation of this switch uniformly with the global standard deviation. Excluded are stochastic shutdowns of single zero ordinates with the individual standard deviation 99.99 m.

2.3 Systra – Adjustment and Analysis

2.3.1 2019: Analysis parameters for observations in Systra output files

The analysis parameters EV, NV, GRZW and GF of the observations are also written to the output files of the observations which have the fix name Systra.LOK, Systra.DIG, Systra.KAN, Systra.ZUS and Systra.REF.

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In comparison to the Systra observation input files of the same format called <project name>.<ending>, the output files contain only the observations which are included in the adjustment, not those which have been excluded because of topological reasons with at Systra program start (see Systra.ERR).

With respect to the associated input file <projectname>.KOO, there is a new output file called Systra.REF for the reference coordinates as observations. That naming goes outside the file name rule as there is already the file Systra.KOO for the adjusted result coordinates.

2.3.2 2019: Adaptations to the Brandenburg Point Identity Proof

The recalculation of balanced measurement lines into the locality continues to be a component of surveying regulations, implemented, for example, in the proof of point identity of the State of Brandenburg.

In this calculation, the measurements are fixed in the starting point of the lines, a calculation which is opposite to adjustment principles. The development adaptations concern the effects of special cases with functional or stochastic shutdowns in the starting points of the measurement lines.

2.3.3 2019: Sequential calculation of approximate transformation parameters

In very heterogeneous observation configurations with orthogonal measurements, for which no local digitized coordinates (e.g. ALKIS as graphical basis) are available, the adjustment level 1 (AGL1) may have difficulty to converge.

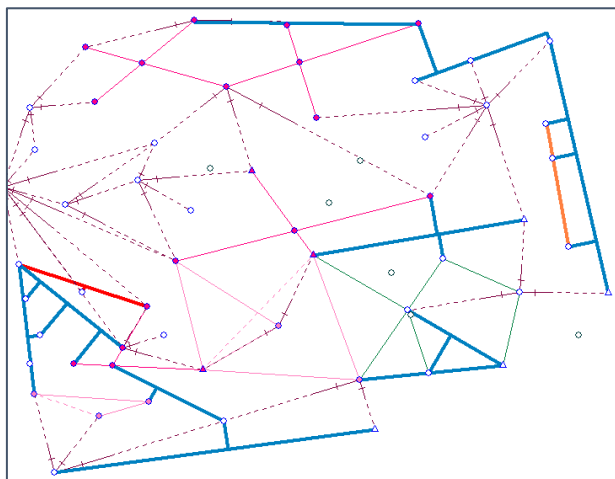
Ausgleichungsstufen	1	1	0
Dateneingabe und Netzbildung...			
Referenzpunkte	:		7
Beobachtungen			
Tachymeter			
Polare Standpunkte	:	12	
Richtungen	:	45	
Polarstrecken	:	45	
Vermessungsrisse			
Abszissen und Ordinaten	:	38	
Zusätzliche Abszissen	:	0	
Zusätzliche Ordinaten	:	9	
Strecken	:	14	
Bogenschnitte	:	3	
Geradenschnitte	:	4	
Kreisbögen	:	0	
Durchfluchtungspunkte	:	6	
Abstandspunkte	:	3	
Karten			
Digitalisierte Koordinaten	:	0	
Bedingungen			
Rechtwinkel	:	0	
Geraden	:	0	
Parallelen	:	0	
Punktidentitäten	:	0	
Unbekannte	:		
Neupunkte	:	48	
Orthogonale Systeme	:	13	
Messungslinien	:	10	
Digitalisierungen	:	0	
Durchfluchtungen	:	2	
Abstände Punkt-Linie	:	1	
Näherungswerte für	:		
Neupunkte	:	0	
Orthogonale Systeme	:	0	

Näherungskoordinatenberechnung...			
Iteration	1	ATPV = 0.1077E+03	MAX. NV1 = 0.0
Iteration	2	ATPV = 0.6927E+01	MAX. NV1 = 0.0
Iteration	3	ATPV = 0.5966E+01	MAX. NV1 = 0.0
Iteration	4	ATPV = 0.5138E+01	MAX. NV1 = 0.0
Iteration	5	ATPV = 0.4424E+01	MAX. NV1 = 0.0
Iteration	6	ATPV = 0.3809E+01	MAX. NV1 = 0.0
Iteration	7	ATPV = 0.3279E+01	MAX. NV1 = 0.0
Iteration	8	ATPV = 0.2817E+01	MAX. NV1 = 0.0
Iteration	9	ATPV = 0.2426E+01	MAX. NV1 = 0.0
Iteration	10	ATPV = 0.2089E+01	MAX. NV1 = 0.0
Iteration	11	ATPV = 0.1798E+01	MAX. NV1 = 0.0
Iteration	12	ATPV = 0.1548E+01	MAX. NV1 = 0.0
Iteration	13	ATPV = 0.1328E+01	MAX. NV1 = 0.0
Iteration	14	ATPV = 0.1144E+01	MAX. NV1 = 0.0
Iteration	15	ATPV = 0.9849E+00	MAX. NV1 = 0.0
Iteration	16	ATPV = 0.8481E+00	MAX. NV1 = 0.0
Iteration	17	ATPV = 0.7301E+00	MAX. NV1 = 0.0
Iteration	18	ATPV = 0.6286E+00	MAX. NV1 = 0.0
Iteration	19	ATPV = 0.5411E+00	MAX. NV1 = 0.0
Iteration	20	ATPV = 0.4639E+00	MAX. NV1 = 0.0
Iteration	21	ATPV = 0.3997E+00	MAX. NV1 = 0.0
Iteration	22	ATPV = 0.3443E+00	MAX. NV1 = 0.0
Iteration	23	ATPV = 0.2967E+00	MAX. NV1 = 0.0
Iteration	24	ATPV = 0.2557E+00	MAX. NV1 = 0.0
Iteration	25	ATPV = 0.2204E+00	MAX. NV1 = 0.0
Iteration	26	ATPV = 0.1901E+00	MAX. NV1 = 0.0
Iteration	27	ATPV = 0.1633E+00	MAX. NV1 = 0.0
Iteration	28	ATPV = 0.1411E+00	MAX. NV1 = 0.0
Iteration	29	ATPV = 0.1221E+00	MAX. NV1 = 0.0
Iteration	30	ATPV = 0.1057E+00	
Abbruchschranke erreicht			
Strenge Ausgleichung...			
Iteration	1	ATPV = 0.1067E+03	VVP = 0.2551E+06
Iteration	2	ATPV = 0.2172E+01	VVP = 0.1136E+02
Iteration	3	ATPV = 0.6405E-04	VVP = 0.6085E+00
Abbruchschranke erreicht			
Ergebnis			
Unbekannte	=	171.0	
Redundanz	=	53.0	
Sigma0	=	0.1	

SystraShell: Messages about the network scope and the systra iteration process of AGL1 and AGL2 (excerpt)

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Sysged: Fictitious example with a very heterogeneous observation configuration, Orthogonal observations bold, other observations narrowly displayed

Wenn die Näherungskoodinaten über die Datei Systra.KOO geliefert werde, ist es ratsam die AGL1 nicht anzuschalten und stattdessen die sequentielle Berechnung von orthogonalen Transformationsparametern zu nutzen, die der AGL2 vorgeschaltet ist. Sie wurde nun noch einmal optimiert.

If the approximate coordinates are supplied from the file Systra.KOO, it is advisable not to switch on the AGL1 and instead to use the sequential calculation of orthogonal transformation parameters, which is upstream of the AGL2. The functionality was now optimized again.

```
Ausgleichungsstufen      0      1      0

Dateneingabe und Netzbildung...

...

Strenge Ausgleichung...
Iteration 1  ATPV = 0.1176E+03  VVP = 0.2897E+07
Iteration 2  ATPV = 0.1561E+05  VVP = 0.2437E+09
Iteration 3  ATPV = 0.4041E+00  VVP = 0.9450E+00
Iteration 4  ATPV = 0.1218E-04  VVP = 0.6085E+00
Abbruchschranke erreicht
Ergebnis
Unbekannte = 171.0
Redundanz  = 53.0
Sigma0     = 0.1
```

SystraShell: Reports on the Systra iteration process of the AGL2 (excerpts)

```
=====
Näherungswertberechnung für Transformationsparameter
=====

Bisher unbestimmte lokale Systeme (MLI, DIG, GPS)

1 S      MLI_01 0  33445555.2  5800006.3  0.1641  0.9865  Näherungswerte bestimmbar
2 S      MLI_02 0  33445566.0  5800000.0  -0.0983  -0.9951  Näherungswerte bestimmbar
3 S      MLI_03 0  33445560.6  5800003.1  -0.5016  0.8650  Näherungswerte bestimmbar
4 S      MLI_04 0  33445538.5  5800005.8  -0.6289  0.7775  Näherungswerte bestimmbar
5 S      MLI_05 0  33445550.1  5799996.9  0.4439  -0.8961  Näherungswerte bestimmbar
6 S      MLI_06 0  33445540.5  5799993.9  0.1321  0.9912  Näherungswerte bestimmbar
7 S      MLI_07 0  33445538.5  5800005.8  -0.9935  0.1138  Näherungswerte bestimmbar
8 S      MLI_09 0  33445561.0  5800016.2  0.3418  0.9399  Näherungswerte bestimmbar
9 S      MLI_10 0  33445548.4  5800019.6  -0.0119  0.9999  Näherungswerte bestimmbar
10 S     MLI_11 0  33445568.7  5800018.5  -0.9741  0.2263  Näherungswerte bestimmbar

Näherungskoodinaten gespeichert siehe Datei Systra.KOO.
Näherungstransformationsparameter erzeugt siehe Datei Systra.SYS.

Bisher unbestimmte Ordinatensysteme (FLU, APL, PMA)

1 S      FLU_01 1  33445561.9  5799999.6  -0.9952  0.0983  Näherungswerte bestimmbar
2 S      FLU_03 1  33445569.0  5800010.8  -0.1773  -0.9842  Näherungswerte bestimmbar
3 S      APL_01 4  33445542.2  5800004.6  -0.9498  -0.3128  Näherungswerte bestimmbar

Näherungstransformationsparameter erzeugt siehe Datei Systra.SYS.
```

Systra.ERR: Note on the sequential calculation of orthogonal transformation parameters

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2.3.4 2019: Correction of weighting for elimination of polar measurements

The topological network check of Systra eliminates the directions that are not sufficient for point determination. These eliminations lead to warnings in the error file Systra.ERR and on the screen, but not to the abort of the program.

Eliminationen bei der Netzbildung									
LfdNr	Fehlerart	Beobachtungstyp	Beschreibung...				Unbestimmter Punkt		
1	Warnung	Richtung	0	229/000	0	459/000	0.00	69P	0 459/000

Systra.ERR: Warning to an eliminated direction during network check

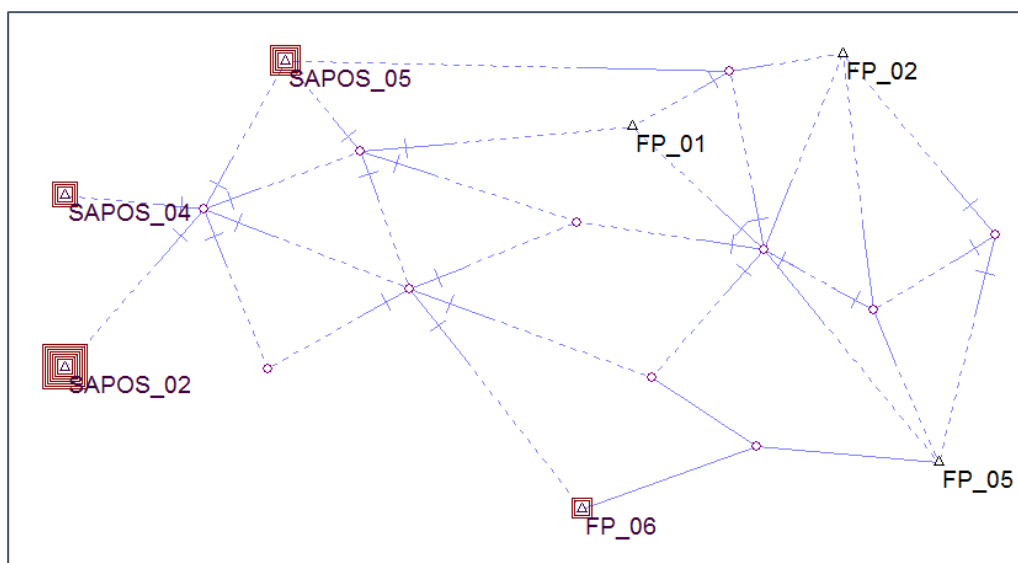
Dateneingabe und Netzbildung...		
Referenzpunkte	:	23
Beobachtungen		
Tachymeter		
Polare Standpunkte	:	84
Richtungen	:	221
verwendet	:	220
eliminiert	:	1
Polarstrecken	:	183
Vermessungsrisse		

SystraShell: Screen messages (excerpt)

If the user ignored these warnings until now, means he did not remove the corresponding direction from the original data material or introduced additional measurements so that the direction can be used to form a network, the standard deviations assigned to the remaining directions were shifted. This shortcoming has now been eliminated. Nevertheless, all warnings reported by Systra should be considered.

2.3.5 2018: Adjustment of Signal measurements

Signal measurements are direct date-determining measurements. They can be introduced redundantly or as a means for each point. Net georeferencing can be supplemented by official reference points.



Sysplan: Network consisting of Signal measurements, official reference points and polar measurements

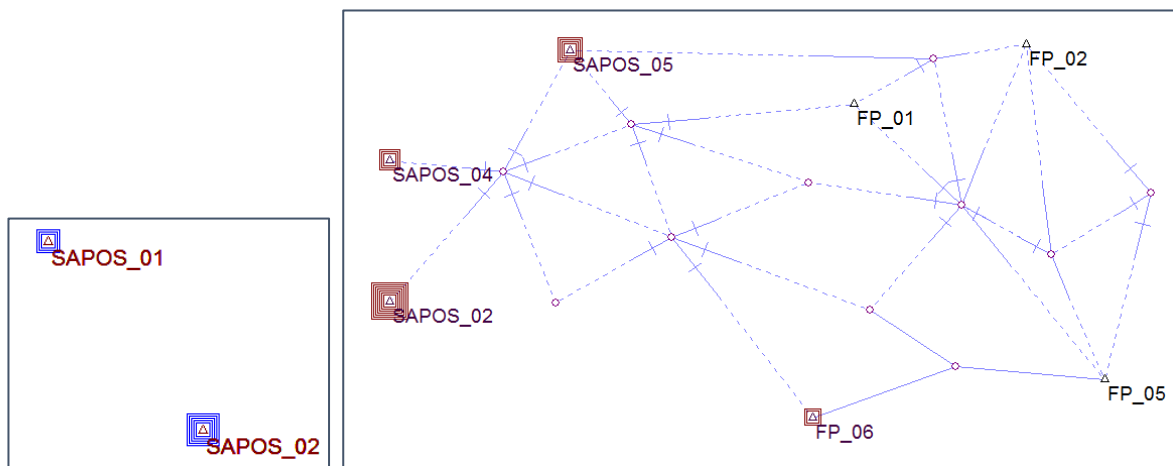
Date: 25.11.2019

2.3.6 2018: Free Network Adjustment

The free network adjustment has already been available with the release of Systra Release 8 in December 2016, was then maintained in 2017. The relationships with GNSS measurements and the use of official reference points are briefly explained below.

2.3.7 2018: Adjustment of GNSS Measurements

GNSS measurements are direct data-determining measurements. They are therefore integrated in a free network equalization, unlike official reference coordinates, which are eliminated by *Total toe minimization*.



GNSS measurements and polar measurements - official benchmarks

GNSS and polar measurements are compensated in a network adjustment without official reference coordinates. This network arrangement is intended to detect the quality of the measurements freed from mains voltages. The omission of official reference coordinates and the use of SAPOS points makes it unnecessary to create a network balance.

2.3.8 2018: Allow 15-digit system names in the adjustment

Due to the internal arrangement of the structure of the normal equation matrix in the Systra equation, the distinction between point numbers and system names must be ensured. Therefore, a leading "S" in the system name has always been required so far, which required him to have a maximum available length of 14 characters. This collided with requirements in the regulatory framework of the QL guidelines. Since mid of 2017, 15 characters are allowed for input from the system names.

2.3.9 2018: Stochastic treatment of zero ordinates in the equalization

The special stochastic treatment of ordinates with the measured value 0.00 m was requested for the QL procedure Brandenburg. Their weighting now optionally takes place separately from regular ordinates with measured values not equal to zero, but only by global control. In SystraShell, this control is offered under control observations:

☐ Null-Ordinaten separat

Global switch zero ordinates separately

Null-Ordinaten: [cm]

Global control sigma zero ordinates

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In addition, the standard deviations for zero ordinates can be treated equally. For this there is a control in SystraShell which sets the standard deviations of all zero ordinates equal. You can also find this control in the tab control observations.

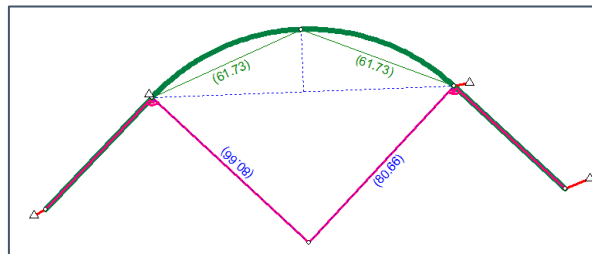
☒ Alle Null-Ordinaten gleich

SystraShell: Global control equal treatment of zero ordinates

Note: This control is the same as for *All Reference Coordinates equal*. Individual standard deviations become ineffective, the global control is used, contrary to the other prioritization Individual before Grouped before Global.

2.3.10 2018: Adjustment of a vertex in the arc

Systra gets the center point of a circular arc, reshaped by Sysged with reading ALKIS data carrying an arc midpoint (vertex). Systra uses it to ensure optional transitions to neighbor edges or arcs. With and after adjustment, the vertex has to have arc midpoint coordinates again.

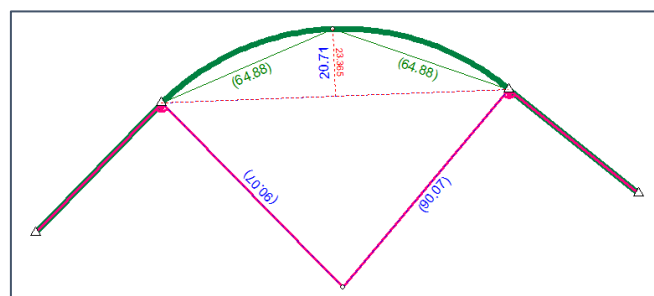


Position of a circular arc and changing reference coordinates before the adjustment

This requirement is modeled as follows:

- ◇ Topologically, Sysged creates a midpoint for the arc. This fits into the existing previous compensation approach for circular arcs. In addition, the center is required for optional circular arc transition conditions such as right angle and straight line conditions.
- ◇ With importing Systra input file data, Sysged has created an artificial observation arrow height with a measured value calculated via the local graphical coordinates, which is to ensure the central position of the vertex perpendicular to the arc. Here, the existing control parameters for arrow heights (standard deviation) of the circular arc are used.
- ◇ An internal equality condition of the two distances of the vertex to the beginning and the end point of the circular arc is to ensure the central tangential position of the vertex on the circular arc. New control parameters for the vertex point (switch, standard deviation) are used here, for further description see SystraShell.

With the adjustment modeled in this way, the radius, arrowhead, and arc length of the arc significantly change, but the vertex falls into the center of the arc.



Position of a circular arc and changing reference coordinates after the adjustment

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2.4 Sysplan – Analysis Graphic Viewer

2.4.1 2019: Import and memory management of very large projects

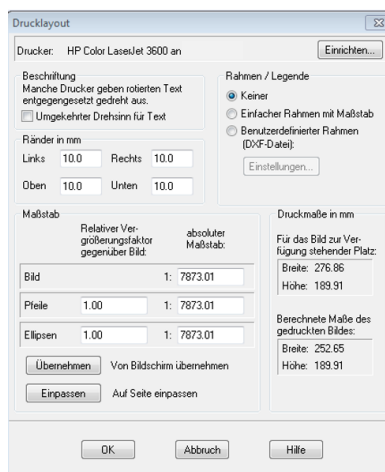
Memory management has been optimized for the visualization of very large projects with more than 100,000 points (for example, projects for the homogenization of geospatial and pipeline data). In the course of this work, the import of the graphic data generated by Systra has also become considerably faster. Even with typical project sizes (QL project with geospatial reference data), these optimizations are significantly noticeable up from about 20,000 points. At the same time, the wanted or unintentional operation of the mouse during the import was checked and its behavior has been improved. The once-a-day experience of constantly repeated and uninterruptible pictorial structure does not occur any longer.

2.4.2 2019: Corrections at combining Print Layout / Print Preview / Print

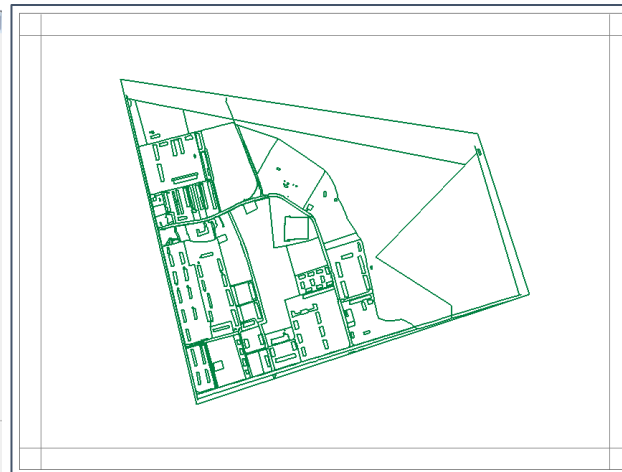
The functions Print Layout, Print Preview and Print can now be combined without a crash.



Sysplan: Function buttons of the mentioned functions



Sysplan: Print layout



Sysplan: Print preview (simple frame)

End of File