ASSESSMENT OF SURROUNDING LOCATION WITH RESPECT TO THE BLASTING LOCATIONS OF PROPOSED HIGHWAY CONSTRUCTION PROJECT USING PostGIS

SJL003- DATABASE AND DATA MANAGEMENT

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2   INTRODUCTION

For our case study we have selected the ongoing central expressway highway construction project in Sri Lanka which is extended from Kurunegala to Kandy. We have considered the section in proposed highway trace which is lie between chainage CH - 0.0km to CH - 0.8km. When consider the construction level of the proposed highway trace, this section is mainly consisted with huge, hard rock area which cannot be removed by normal excavations. These rocks should be removed by explosive blasting. Therefore blasting activities should be carried out in order to excavate rocks to continue the construction activities. But these blasting activities can be affected to the surrounding structures. Hence blasting effect should be assessed. Not only the blasting activities but also several structures have to be removed due to land acquiring for highway project.

For this assessment as raw data, we utilized details of divided sections in highway, details of blasting locations, details of surrounding roads and structures as well as details of blasting contactors. Here we used both spatial and non-spatial data.
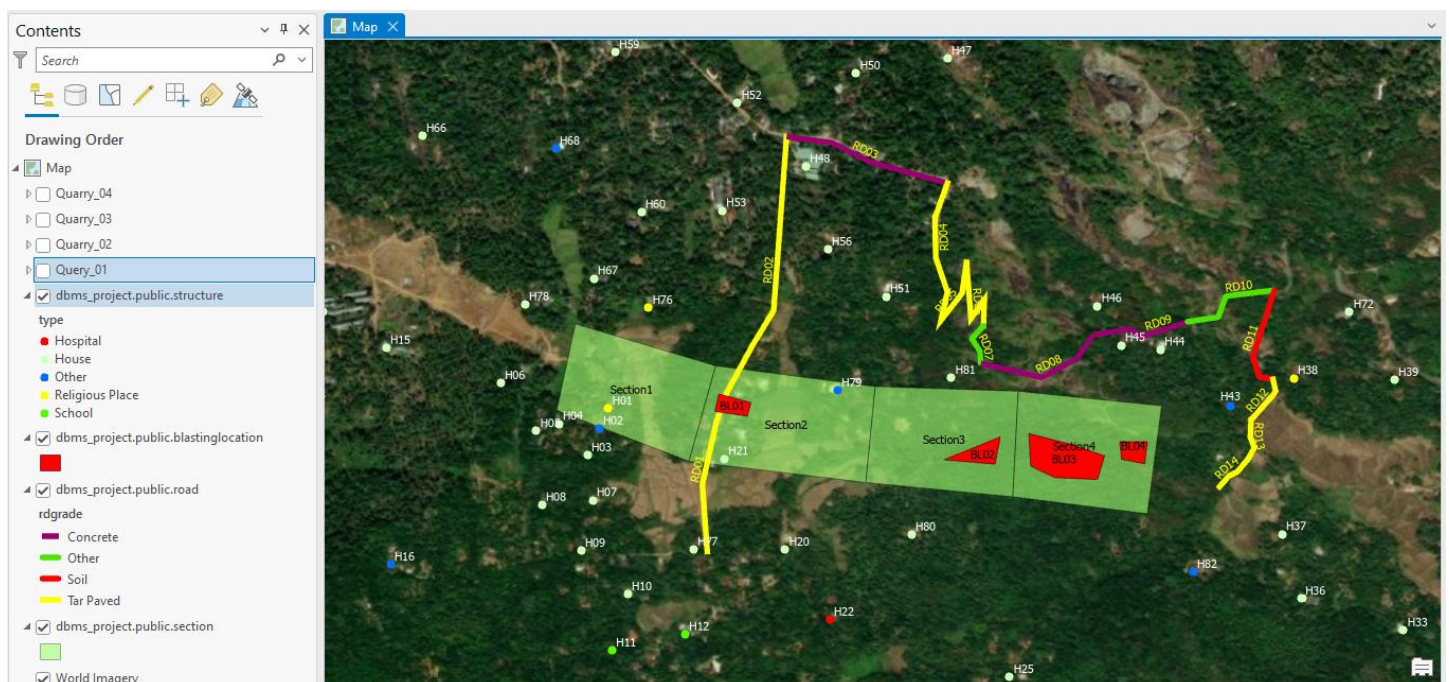

Figure 1 – Assessment Area

Objectives of this assessment are listed as follows.

1. Identify the sections which have more than one blasting locations and no blasting locations.
2. Identify the number of structures locating close to the each blasting locations.
3. Identify the structures which should be evacuated (permanent or temporarily) from the blasting locations and the proposed highway trace.
4. Find out the minimum length for proposed overpass bridge which should be constructed for permanently evacuating the existing road due to the highway construction.
5. After completion of the project, to make decisions regarding the further developments as CSR (Corporate Social Responsibility) projects.

This assessment is mainly carried out under than 4 sections as follows;

1. Conceptual DB design – ER Diagram
2. Logical DB design – Relational Tables
3. Physical DB design – SQL Implementation
4. Spatial application

3 Conceptual DB design – Entity Relationship Diagram

In Entity Relationship diagram, "structure", "road", "blastingLocation", "section" entities contain location (point), rdPosition (polyline), blPosition (polygon), sePosition (polygon) as spatial attributes, respectively.
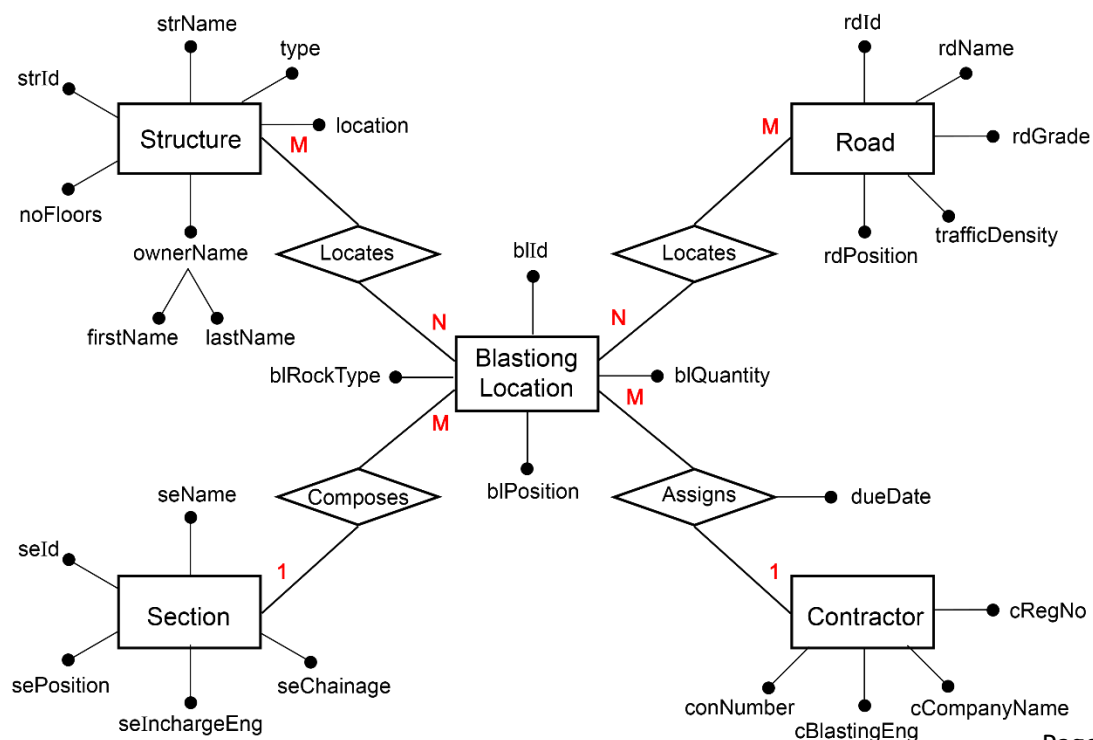
Figure 2 - Entity Relationship Diagram

3.1   Assumptions for Entity Relationship diagram

There are some assumptions which are applied for making the ER diagram. The assumptions are listed as follows.

1. Owner name of structure (ownerName) is complex attribute
2. Contractor's Contact number (conNumber) is multivalued attribute
3. For one blasting location has been granted to one contractor
4. Blasting location does not cross any section
5. Section's incharge engineer name (seInchargeEng) and contractor's blasting engineer name (cBlastingEng) are not complex attributes

4   Logical DB design – Relational Tables

structure

strId	strName	firstName	lastName	type	noFloors	location

road

rdId	rdName	trafficDensity	rdGrade	rdPosition

blastingLocation

blId	blQuantity	blRockType	blPosition	seId	cRegNo	dueDate

section

seId	seName	seInchargeEng	seChainage	sePosition

contactor

cRegNo	cCompanyName	cBlastingEng

contactNumber

conId	conNumber	cRegNo

surroundingStructure

strId	blId

surroundingRoad
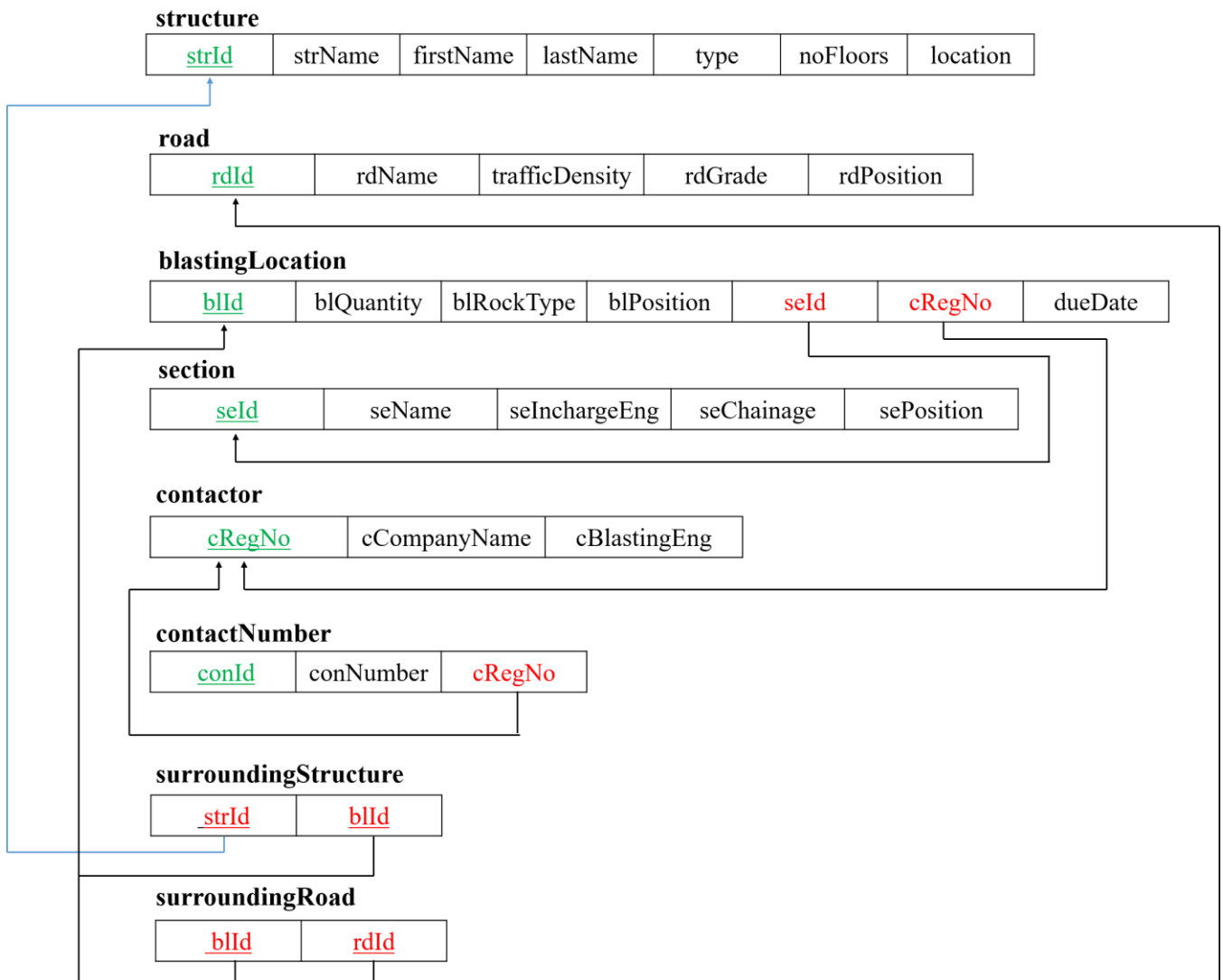
blId	rdId

Figure 3 - Relational tables

5 Physical DB design – SQL implementation

We used pgAdmin for creating the database and postgis spatial reference extension was added to our database.

5.1 Create tables

According to relational DB model we created 08 tables including spatial and non-spatial columns. Instead of manually creating the tabels in pgAdmin, we have utilized a tool of postgres called "SQL shell" which reduces the time to generate the tables. We have wrote following SQL statements in Data Definition Language and these SQL statements were executed in SQL shell to create tables.

SQL statement for creating table name "structure"

```
CREATE TABLE structure(
strId varchar(5) NOT NULL,
strName varchar(30) NOT NULL,
firstName varchar(30),
lastName varchar(30),
type varchar(20) NOT NULL,
noFloors numeric,
location geometry(POINT,4326) NOT NULL,
CONSTRAINT pk_structure PRIMARY KEY(strId),
CONSTRAINT ck_type CHECK (type IN ('House', 'Religious Place', 'School',
'Hospital','Other')));
```

SQL statement for creating table name "road"

```
CREATE TABLE road(
rdId varchar(5) NOT NULL,
rdName varchar(30) NOT NULL,
trafficDensity numeric,
rdGrade varchar(20),
rdPosition geometry(LINESTRING,4326) NOT NULL,
CONSTRAINT pk_road PRIMARY KEY(rdId),
CONSTRAINT ck_grade CHECK (rdGrade IN ('Concrete', 'Soil', 'Tar Paved', 'Other')));
```

SQL statement for creating table name "blastingLocation"

```
CREATE TABLE blastingLocation(
blId varchar(15) NOT NULL,
blQuantity numeric,
blRockType varchar(30),
blPosition geometry(POLYGON,4326) NOT NULL,
seId varchar(5),
cRegNo varchar(10),
dueDate DATE,
CONSTRAINT pk_blastingLocation PRIMARY KEY(blId),
CONSTRAINT fk_blastingLocation1 FOREIGN KEY (seId) REFERENCES section(seId) ON DELETE
SET NULL ON UPDATE CASCADE,
CONSTRAINT fk_blastingLocation2 FOREIGN KEY (cRegNo) REFERENCES contractor(cRegNo) ON
DELETE SET NULL ON UPDATE CASCADE,
CONSTRAINT check_rockType CHECK (blRockType IN ('Charnokite','Charnokitic Gneiss',
'Feldsphathic Gneiss', 'Garnert Biotite Gneiss', 'Other')));
```

SQL statement for creating table name "section"

```
CREATE TABLE section(
seId varchar(5) NOT NULL,
seName varchar(20) NOT NULL,
seInchargeEng varchar(30),
seChainage varchar(20),
sePosition geometry(POLYGON,4326) NOT NULL,
CONSTRAINT pk_section PRIMARY KEY(seId));
```

SQL statement for creating table name "contractor"

```
CREATE TABLE contractor(
cRegNo varchar(10) NOT NULL,
cCompanyName varchar(30) NOT NULL,
cBlastingEng varchar(30),
CONSTRAINT pk_contractor PRIMARY KEY(cRegNo));
```

SQL statement for creating table name "contactNumber"

```
CREATE TABLE contactNumber(
conId varchar(5) NOT NULL,
conNumber numeric,
cRegNo varchar(10),
CONSTRAINT pk_contactNumber PRIMARY KEY(conId),
CONSTRAINT fk_contactNumber FOREIGN KEY (cRegNo) REFERENCES contractor(cRegNo)
ON DELETE SET NULL
ON UPDATE CASCADE);
```

SQL statement for creating table name "surroundingStructure"

```
CREATE TABLE surroundingStructure(
strId varchar(5),
blId varchar(5),
CONSTRAINT pk_surroundingStructure PRIMARY KEY(strId,blId),
CONSTRAINT fk_surroundingStructure1 FOREIGN KEY (strId) REFERENCES structure(strId)
ON DELETE SET NULL ON UPDATE CASCADE,
CONSTRAINT fk_surroundingStructure2 FOREIGN KEY (blId) REFERENCES
blastingLocation(blId) ON DELETE SET NULL ON UPDATE CASCADE);CONSTRAINT
fk_contactNumber FOREIGN KEY (cRegNo) REFERENCES contractor(cRegNo)
ON DELETE SET NULL
ON UPDATE CASCADE);
```

SQL statement for creating table name "surroundingRoad"

```
CREATE TABLE surroundingRoad(
rdId varchar(5),
blId varchar(5),
CONSTRAINT pk_surroundingRoad PRIMARY KEY(rdId,blId),
CONSTRAINT fk_surroundingRoad1 FOREIGN KEY (rdId) REFERENCES road(rdId) ON DELETE
SET NULL ON UPDATE CASCADE,
CONSTRAINT fk_surroundingRoad2 FOREIGN KEY (blId) REFERENCES blastingLocation(blId)
ON DELETE SET NULL ON UPDATE CASCADE);
```

5.2 Inserting data to database tabels

In order to generate non-spatial data, we have used automatic data generator "Mockaroo" and for generating the spatial data we have used Google Earth Pro and "ST_GeometryFromText" statement. Microsoft Excel has been used for merging and organizing the spatial and non-spatial data together. Finally tab delimited text files have been saved for each database table separately. (Annexures).

Following SQL statements in Data Manipulation Language are used to insert the data to create tables in SQL shell.

```
COPY structure (strId,strName,firstName,lastName,type,noFloors,location)
FROM 'D:\SQL\structureSQL.txt'
DELIMITER E'\t';

COPY road (rdId,rdName,trafficDensity,rdGrade,rdPosition)
FROM 'D:\SQL\roadSQL.txt'
DELIMITER E'\t';

COPY blastingLocation (blId,blQuantity,blRockType,blPosition,seId,cRegNo,dueDate)
FROM 'D:\SQL\blastingLocationSQL.txt'
DELIMITER E'\t';
```

```
COPY section (seId,seName,seInchargeEng,seChainage,sePosition)
FROM 'D:\SQL\sectionSQL.txt'
DELIMITER E'\t';

COPY contractor (cRegNo,cCompanyName,cBlastingEng)
FROM 'D:\SQL\contractorSQL.txt'
DELIMITER E'\t';

COPY contactNumber (conId,conNumber,cRegNo)
FROM 'D:\SQL\contactNumberSQL.txt'
DELIMITER E'\t';

COPY surroundingStructure (strId,blId)
FROM 'D:\SQL\surroundingStructureSQL.txt'
DELIMITER E'\t';

COPY surroundingRoad (rdId,blId)
FROM 'D:\SQL\surroundingRoadSQL.txt'
DELIMITER E'\t';
```

6   Data and queries used to test of the model and visualization by ArcGIS pro and results by pgAdmin

Problem 01 & Query 01 -

For allocating the explosives for each highway section, Explosive controller of the region wants to get details of seId, seChainage, SeInchargeEng, Number of blasting locations of each section, Summation of estimated blasting rock volume of each blasting location.

```
SELECT se.seId, se.sechainage, se.seInchargeEng, count(b.blId) AS "No of Blasting
Locations", COALESCE(SUM(b.blquantity),0) AS "Blasting Qty"
FROM section se LEFT JOIN blastingLocation b ON se.seId=b.seId
GROUP BY se.seId
ORDER BY 4 DESC, 5 DESC;
```

|	seid [PK] character varying (5)	sechainage character varying (20)	seinchargeeng character varying (30)	No of Blasting Locations bigint	Blasting Qty numeric
1	SEC04	CH-0.6+0.8	Agneta	2	165000
2	SEC02	CH-0.2+0.4	Rochette	1	10000
3	SEC03	CH-0.4+0.6	Aida	1	6000
4	SEC01	CH-0.0+0.2	Benito	0	0

Problem 02 & Query 02 -

During the blasting time, it has been decided to evacuate the peoples within 300m distance interval from each blasting location temporary. So incharge engineers of all sections want to know how many structures are located within 300m distance interval from each blasting location.

```
SELECT b.blId, COUNT(s.*) AS "No of Structures"
FROM structure s JOIN blastingLocation b ON
ST_Within(s.location,ST_Buffer(b.blPosition,300*0.00001,'endcap=round join=round'))
GROUP BY b.blID;
```

	blid [PK] character varying (15)	No of Structures bigint
1	BL01	13
2	BL02	6
3	BL03	7
4	BL04	7

Incharge engineers of all sections want to look situation of structures within 300m distance interval with 300m buffer zone from each blasting location.

```
SELECT blId, ST_Buffer(blPosition,300*0.00001,'endcap=round join=round')
FROM blastingLocation;
```
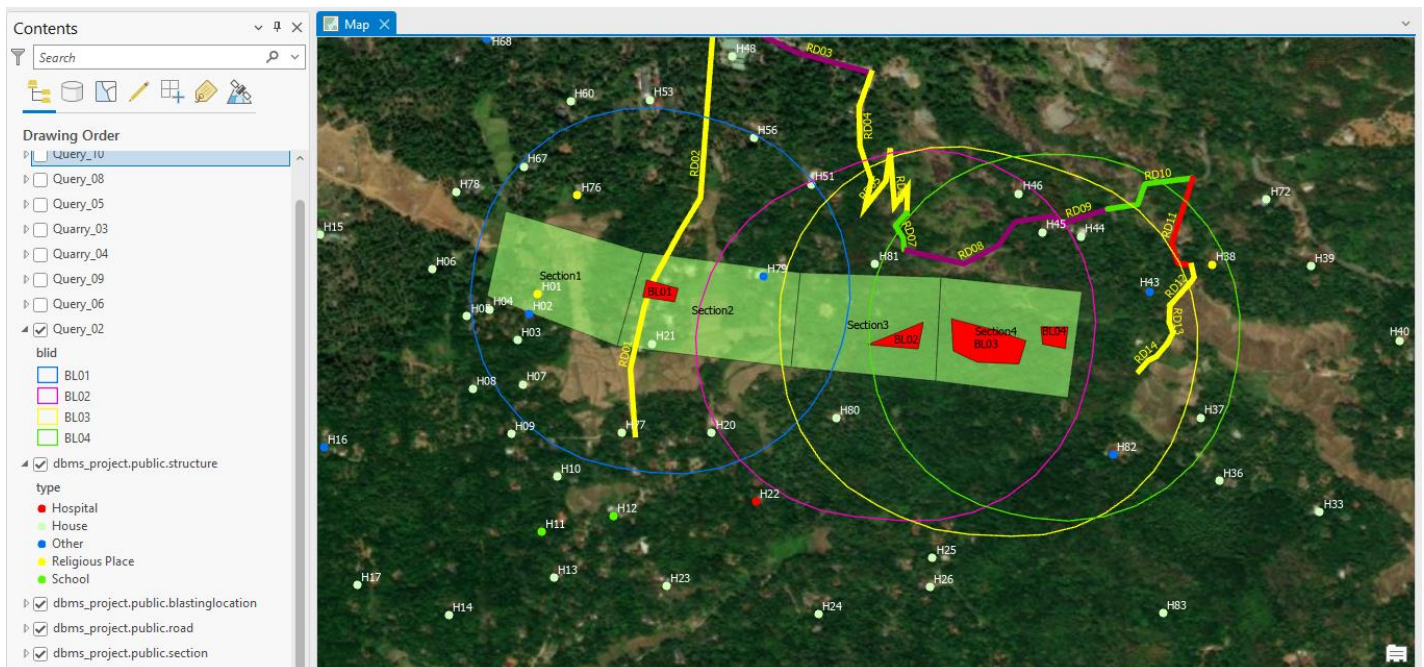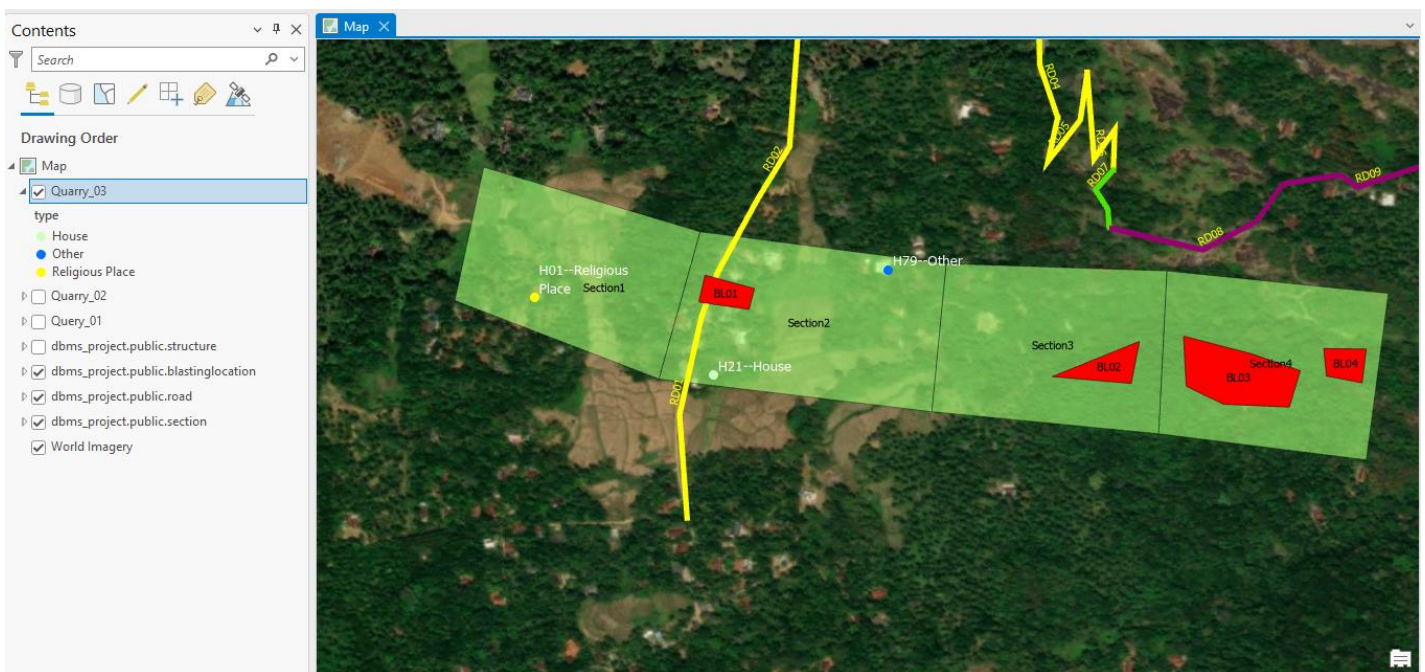
Problem 03 & Query 03 -

During the construction of highway trace, if any structures are laying within the highway trace those should be evacuated permanently. Therefore designers want to know the location of structure, strId, type of structure, Number of floors of the structures which are located within the proposed highway trace.

```
SELECT s.strId, s.type, s.noFloors, s.location
from structure s
WHERE ST_Within(s.location,(SELECT ST_Union(se.sePosition) from section se));
```

|	strid [PK] character varying (5)	type character varying (20)	nofloors numeric	location geometry
1	H01	Religious Place	2	0101000020E6100000FFFFFFDF7415544...
2	H21	House	2	0101000020E6100000FBFFFF7F9515544...
3	H79	Other	2	0101000020E6100000FFFFFF3FB515544...

Problem 04 & Query 04 -

During the blasting time, people who are living in the 300m distance from blasting location should be temporary evacuated for safety purposes. Therefore blasting Engineer who allocated the blId="BL01" wants to know position of structures, strId, type which are located within 300m distance interval from blasting location blId="BL01".

```
SELECT s.strId, s.type, s.location
from structure s
WHERE ST_Within(s.location,(SELECT ST_Buffer((b.blPosition), 0.00001*300,
'endcap=round join=round') from blastingLocation b where b.blId ='BL01'));
```

|	strid [PK] character varying (5)	type character varying (20)	location geometry
1	H01	Religious Place	0101000020E6100000FFFFFFDF74155440F6FFFFDFE2891D40
2	H02	Other	0101000020E6100000FCFFFF3F72155440F9FFFF5F8B891D40
3	H03	House	0101000020E6100000FCFFFFFF6E155440FEFFFF3F11891D40
4	H04	House	0101000020E6100000FCFFFFFF66155440FEFFFF7F9E891D40
5	H07	House	0101000020E6100000FEFFFF7F70155440FFFFFFFF48881D40
6	H20	House	0101000020E6100000FEFFFF7FA6155440F9FFFFFF69871D40
7	H21	House	0101000020E6100000FBFFFF7F95155440FBFFFFBF01891D40
8	H51	House	0101000020E6100000FAFFFFBFC2155440F7FFFFDFD98B1D40
9	H56	House	0101000020E6100000FEFFFF7FB2155440FFFFFFBFAB8C1D40
10	H67	House	0101000020E6100000FFFFFFDF70155440F8FFFF9F2A8C1D40
11	H76	Religious Place	0101000020E6100000FEFFFF1F80155440FEFFFF1FA68B1D40
12	H77	House	0101000020E6100000FFFFFFDF8C155440FEFFFF5F6C871D40
13	H79	Other	0101000020E6100000FFFFFF3FB5155440FCFFFF3F338A1D40
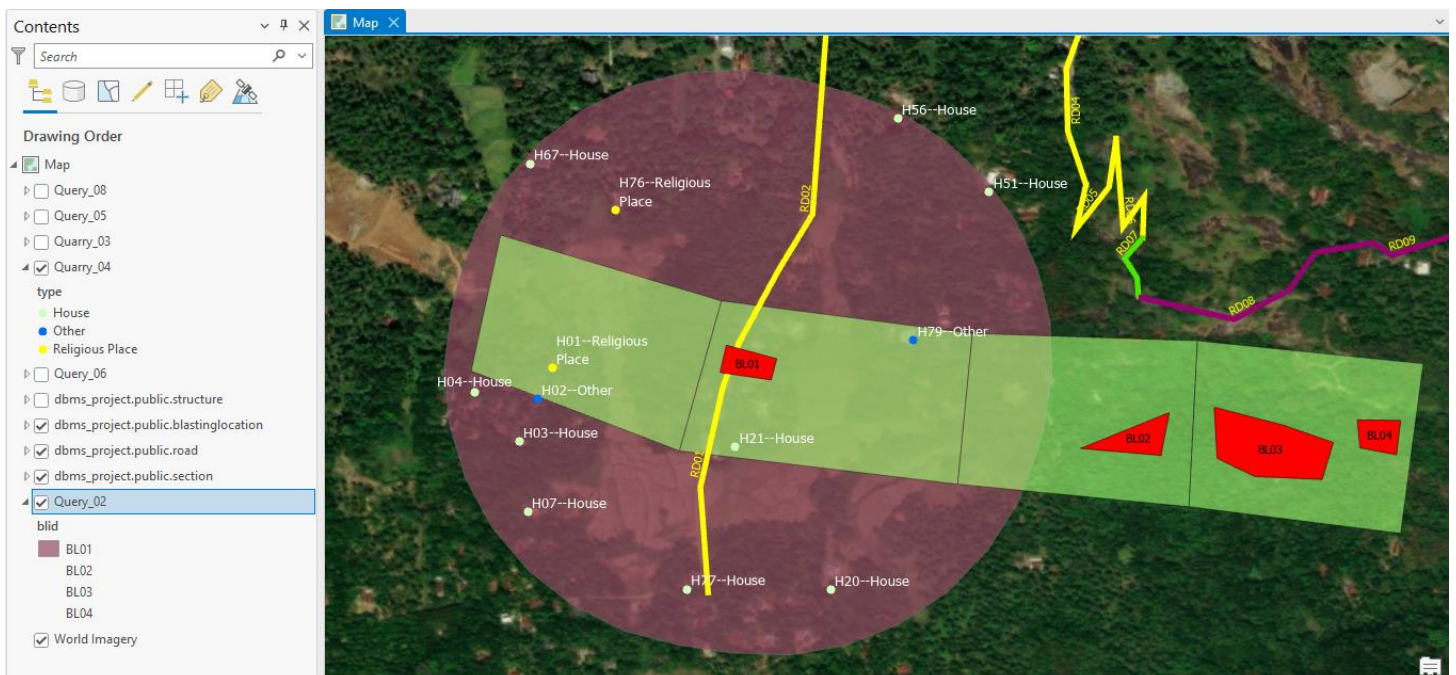
Problem 05 & Query 05 -

During the blasting time, the Blastmate (instrument which used to measure the vibration effect due to blasting) should be fixed in nearest four structures to the each blasting locations. Therefore blasting engineer who allocated the blId="BL03" wants to know the strID, noFloors, distance from blasting location, location of nearest structures to blasting location blId="BL03".

```
SELECT s.strId, s.noFloors, ROUND(ST_length(ST_ShortestLine(s.location,
b.blPosition))*100000) AS "Distance", s.location
from structure s, blastinglocation b
where b.blId = 'BL03'
order by 3 limit 4;
```

	strid [PK] character varying (5)	nofloors numeric	Distance double precision	location geometry
1	H81	1	164	0101000020E6100000FAFFFF1FD5155440F6FFFFFF6D8A1...
2	H45	2	188	0101000020E6100000FAFFFFBF04165440FAFFFF3FFE8A1...
3	H44	2	206	0101000020E6100000FBFFFFDF0F165440FDFFFF9FEB8A1...
4	H82	2	228	0101000020E6100000FCFFFFFF18165440F8FFFFDF07871...
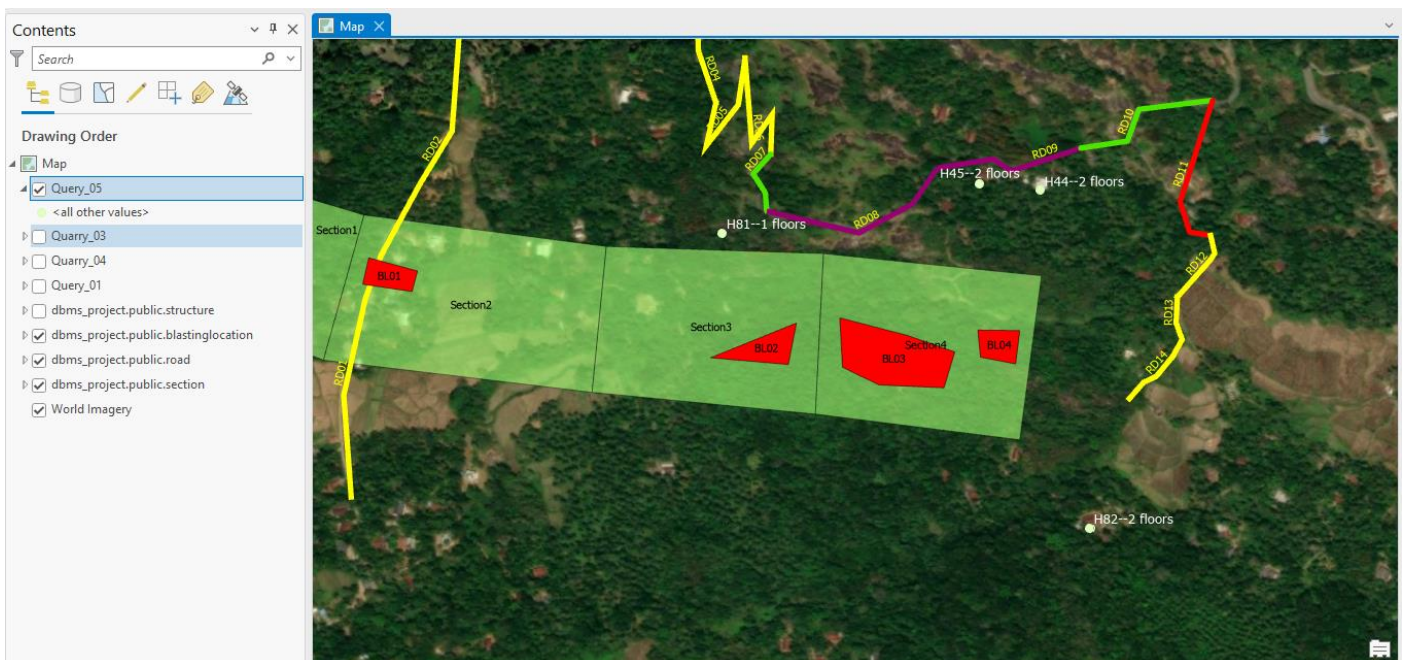
Problem 06 & Query 06 -

With parallel to the highway project, the roads which are located near the highway trace should be developed. Therefore, roads type called "Soil" and "Other" should be converted as Tar paved roads. Designers want to know the location of roads of above mentioned rdGrade, rdId and their length in meters to nearest integer value.

```
select rdId, rdGrade, ROUND(ST_Length(rdPosition)*100000) AS "Length",
ST_Union(rdPosition) AS "Selected Roads"
from road
where rdGrade = 'Other' OR rdGrade='Soil'
group by rdId;order by 3 limit 4;
```

	rdid [PK] character varying (5)	rdgrade character varying (20)	Length double precision	Selected Roads geometry
1	RD07	Other	76	0102000020E610000004000000F...
2	RD10	Other	175	0102000020E610000004000000F...
3	RD11	Soil	180	0102000020E610000004000000F...
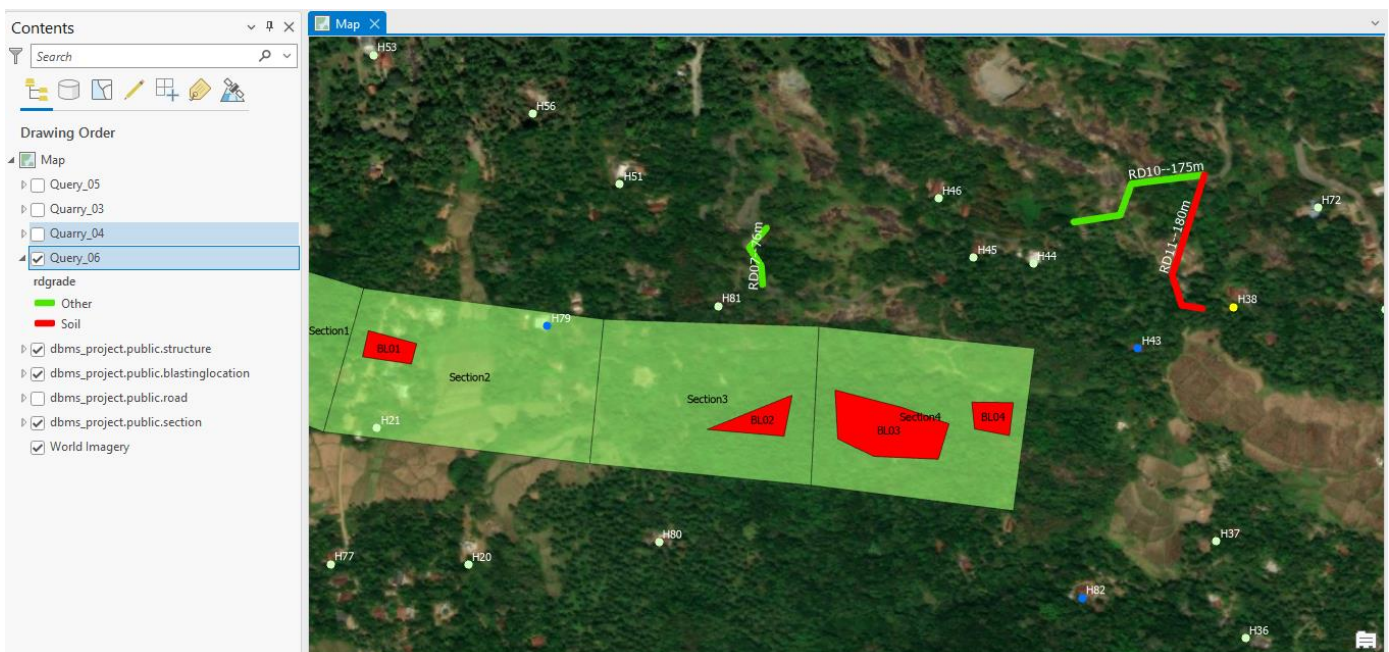
Problem 07 & Query 07 -

The area surrounded by proposed highway trace is highly affected water scarcity problem. Therefore as a CSR project, consultant and contractor parties are introduced new water supply project. Find the GPS point of suitable location (Centroid point) to establish water tank by considering the locations of the all the structures type="Religious Place, "School", "Hospital".

```
SELECT ST_AsText(ST_Centroid(ST_Union(location))) AS "Location for Water Tank"
FROM structure
WHERE type='Religious Place' OR type='School' OR type='Hospital';
```

	Location for Water Tank 🔒 text
1	POINT(80.33777025010848 7.387482802073155)

Problem 08 & Query 08 -

Before commencing the blasting activities, it is proposed that the pre-condition survey of nearby structures should be started on Eastern direction. Hence team which will carry out the pre-condition survey wants to know which structure is located in most Eastern direction and its coordinates in EPSG 5234 projected coordinate system.

```
SELECT strId,location, ST_asText(ST_Transform(location,5234))
FROM structure
ORDER BY ST_X(location) DESC LIMIT 1;
```

	strid [PK] character varying (5) ✏	📖 location geometry 🔒	st_astext 🔒 text
1	H34	0101000020E6100000F...	POINT(153495.46586169215 242021.9220908372)
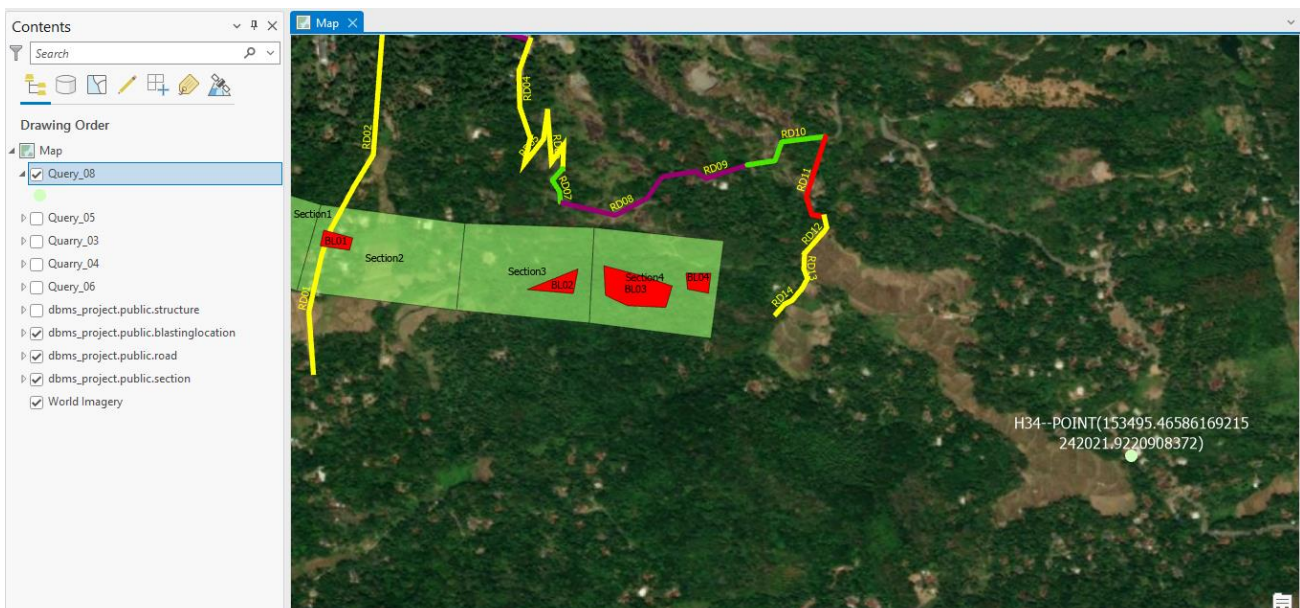
Problem 09 & Query 09 -

Designers want to find out the minimum length for proposed overpass bridge which should be constructed for permanently evacuating the existing road due to the highway construction.

```
SELECT r.rdId, ST_Intersection(r.rdposition ,
se.sePosition),ROUND(ST_Length(ST_Intersection(r.rdposition ,
se.sePosition))*100000) AS "Length"
FROM road r JOIN section se ON ST_Intersects(r.rdPosition,se.sePosition);
```

	rdid [PK] character varying (5)	st_intersection geometry	Length double precision
1	RD01	0102000020E610000003000000AC3421919015544056FC8…	126
2	RD02	0102000020E610000002000000FEFFFF1F96155440000000…	46

Problem 10 & Query 10 -

Here in problem 03 designers identified the three structures (H01, H21, H79) should be evacuated permanently because those structures have been located within the proposed highway trace. For selecting the lands to re-locate, designers used criteria as follows.

Lands should be selected within the intersection area of minimum bounding circle of all religious places and minimum bounding circle of all schools. Hence designers want to show the intersection area visually.

```
SELECT type, ST_MinimumBoundingCircle(ST_Union(location)) AS MinimumBoundingCircle
FROM structure
WHERE type='Religious Place' OR type='School'
GROUP BY type;
```

	type character varying (20) 🔒	🔲 minimumboundingcircle geometry	🔒
1	Religious Place	0103000020E610000001000000C10000006669F361D0155440895B7ABDAE991D402FFE49…	
2	School	0103000020E610000001000000C1000000FEFFFFDF8E155440F45EFCCE1B951D408D0A20…	
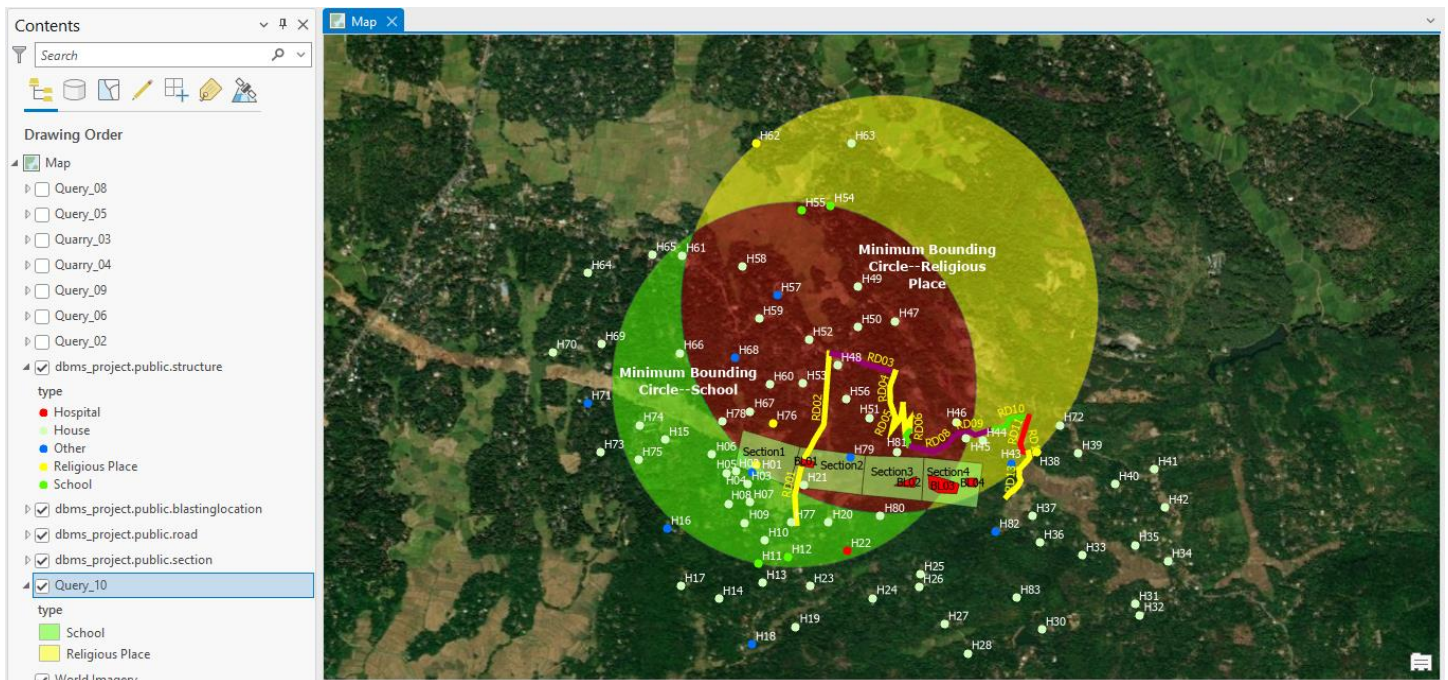
```
H01     Gigabox Maïly   Willmont         Religious Place 2
SRID=4326;POINT(80.3352584838867 7.38465452194213)
H02     Agivu   Liè     Driver  Other   3
SRID=4326;POINT(80.3350982666015 7.38432073593139)
H03     Jetwire Mélissandre     Gwynne  House   1
SRID=4326;POINT(80.3348999023437 7.38385486602783)
H04     Browsebug       Eugénie Tow     House   2
SRID=4326;POINT(80.3344116210937 7.3843936920166)
H05     Feedbug Aurélie Beeby   House   3
SRID=4326;POINT(80.3340225219726 7.38427066802978)
H06     Yombu   Gaëlle  Brydson House   1
SRID=4326;POINT(80.3334197998046 7.38508796691894)
H07     Zoombeat        Daphnée Gever   House   3
SRID=4326;POINT(80.3349914550781 7.38309097290039)
H08     Roomm   Maï     Huyghe  House   3
SRID=4326;POINT(80.3341217041015 7.38301277160644)
H09     Centizu Noëlla  Tonks   House   1
SRID=4326;POINT(80.3347930908203 7.3822283744812)
H10     Cogidoo Ruò     Reuss   House   2
SRID=4326;POINT(80.335594177246 7.38148212432861)
H11     Dynava  Loïc    Richten School  2
SRID=4326;POINT(80.3353271484375 7.38052177429199)
H12     Wikido  Agnès   Fairhead        School  3
SRID=4326;POINT(80.3365783691406 7.3807988166809)
H13     DabZ    Léone   Parmiter        House   2
SRID=4326;POINT(80.3355331420898 7.37971973419189)
H14     Chatterbridge   Méline  Aymerich        House   3
SRID=4326;POINT(80.3337020874023 7.37906742095947)
H15     Blogpad Médiamass       Alban   House   1
SRID=4326;POINT(80.3314590454101 7.38569498062133)
H16     Jetwire Torbjörn        Chadwyck        Other   1
SRID=4326;POINT(80.3315277099609 7.38199424743652)
H17     Livepath        Geneviève       Isbell  House   3
SRID=4326;POINT(80.3321151733398 7.37959289550781)
H18     Wikido  Laurélie        Hoppner Other   3
SRID=4326;POINT(80.3350677490234 7.37716579437255)
H19     Jabbertype      Personnalisée   Balf    House   2
SRID=4326;POINT(80.3369140625 7.37788724899291)
H20     Lazz    Marlène Ledington       House   3
SRID=4326;POINT(80.3382873535156 7.38224029541015)
H21     Feedfish        Bénédicte       Feechan House   2
SRID=4326;POINT(80.3372497558593 7.38379573822021)
H22     Demivee Athéna  Fielders        Hospital        3
SRID=4326;POINT(80.3390502929687 7.38104820251464)
H23     Divanoodle      Sòng    Legg    House   1
SRID=4326;POINT(80.3375015258789 7.37957668304443)
```

H24   Oyoba   Audréanne   Grinter House   1
SRID=4326;POINT(80.3401412963867 7.37908697128295)
H25   Wikizz   Noémie   Defrain House   2
SRID=4326;POINT(80.3421325683593 7.38006734848022)
H26   Voonix   Kuí   De Maria   House   1
SRID=4326;POINT(80.3420867919921 7.37955713272094)
H27   Innotype   Anaïs   Rackley House   2
SRID=4326;POINT(80.3431396484375 7.37800741195678)
H28   Topiclounge   Esbjörn Lyfield House   3
SRID=4326;POINT(80.3441009521484 7.37678527832031)
H29   Devcast Maëlann Strangeways   Other   3
SRID=4326;POINT(80.342674255371 7.37546825408935)
H30   Blognation   Réservés   Wybern House   2
SRID=4326;POINT(80.3471984863281 7.37776517868041)
H31   Yakijo   Mélinda Scotsbrook   House   1
SRID=4326;POINT(80.351089477539 7.37882709503173)
H32   Skidoo   Réservés   Castledine   House   1
SRID=4326;POINT(80.3513031005859 7.37837171554565)
H33   Katz   Ruò   de Bullion   House   2
SRID=4326;POINT(80.348876953125 7.38086366653442)
H34   Topicblab   Maï   Standell   House   1
SRID=4326;POINT(80.3524627685546 7.38062524795532)
H35   Realpoint   André   Renny   House   3
SRID=4326;POINT(80.3511047363281 7.38129711151123)
H36   Realmix Gösta   Tompkiss   House   1
SRID=4326;POINT(80.3471298217773 7.38140535354614)
H37   Blogtags   Tú   MacNeillie   House   2
SRID=4326;POINT(80.3468017578125 7.38251018524169)
H38   Avamm   Lén   Philpots   Religious Place 3
SRID=4326;POINT(80.3470001220703 7.38517522811889)
H39   Kazu   Faîtes   Kilmurry   House   3
SRID=4326;POINT(80.3487243652343 7.38514518737792)
H40   Brainverse   Åsa   Morbey House   1
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H41   Kanoodle   Eléonore   Kershaw House   1
SRID=4326;POINT(80.3518905639648 7.38446283340454)
H42   Devpulse   Félicie Enga   House   1
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H43   Feedfire   Clémentine   Szubert Other   2
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H44   Edgeclub   Publicité   Winthrop   House   2
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H45   Skipstorm   Ruì   Floyd   House   2
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H46   Npath   Naëlle Upston   House   3
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H47     Einti   Publicité       Brigden House    2
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H48     Flipopia        Pò      Clother House    2
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H49     Meevee  Maïlis  Carles  House    1
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H50     Janyx   Adélaïde        Dach    House    1
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H51     Wordify Åslög   Thomason        House    2
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H52     Yoveo   Léandre O'Brogan        House    2
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H53     Vidoo   Eugénie Rubenov House    3
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H54     Roodel  Anaïs   Swait   School   3
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H55     Chatterbridge   Dù      Whenman School   1
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H57     Mynte   Cécilia Plante  Other    2
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H58     Browsetype      Marie-thérèse   Busen   House    1
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H59     Skimia  Lucrèce Berget  House    3
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H60     Jayo    Garçon  Tolchard        House    1
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H61     Ntag    Inès    Bullivent       House    1
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H62     Centimia        Pélagie O'Loughlin      Religious Place 2
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H63     Zoozzy  Yóu     Mordacai        House    2
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H64     Jamia   Kuí     Norridge        House    2
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H65     Meedoo  Pélagie Dinnington      House    2
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H66     Kazio   Réservés        Bavage  House    2
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H67     Skinix  Méng    Cowser  House    3
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H68     Ozu     Styrbjörn       Wateridge       Other    2
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H69     Jayo    Mà      Grassin House    3
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H70   Oyoba   Lài   Bucktrout   House   2
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H71   Miboo   Mélodie Churchman   Other   2
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H72   Skipfire   Maëlla Ambler House   1
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H73   Edgetag Mélissandre   D'Aulby House   1
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H74   Riffwire   Hélèna Trethewey   House   1
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H75   Oloo   Liè   Turmel House   3
SRID=4326;POINT(80.330337524414 7.3485240936279)
H76   Kwimbee Nélie   Tedridge   Religious Place 1
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H77   Quinu   Rébecca Fairman House   3
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H78   Kare   Vérane Mummery House   2
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H79   Tagopia Andréa McCaighey   Other   2
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H80   Skyba   Adélie Towhey House   2
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H81   Nlounge Thérèsa Robertot   House   1
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H82   Dabjam Örjan   Fryett Other   2
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H83   Mydo   Crééz   Jaslem House   2
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RD01   Aimbu   210   Tar Paved
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RD03   Zoovu   90   Concrete
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RD04   Thoughtsphere   240   Tar Paved
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RD05   Quire   200   Tar Paved   SRID=4326;LINESTRING(80.341064453125
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RD06   Lazzy   190   Tar Paved
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RD07   Realblab   50   Other   SRID=4326;LINESTRING(80.341682434082
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RD08   Ainyx   90   Concrete
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7.38591623306274)
RD09   Vidoo   90   Concrete
SRID=4326;LINESTRING(80.3435592651367 7.38591623306274,80.3441925048828
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7.38614034652709)
RD10   Cogilith   50   Other
SRID=4326;LINESTRING(80.3451766967773 7.38614034652709,80.345703125
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7.38667917251586)
RD11   Tavu   20   Soil   SRID=4326;LINESTRING(80.3466644287109
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RD12   Mydo   215   Tar Paved
SRID=4326;LINESTRING(80.3466415405273 7.38515710830688,80.3466873168945
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RD13   Aimbo   220   Tar Paved
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RD14   Flashset   255   Tar Paved
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7.3835744857788,80.3458862304687 7.38350439071655,80.3457260131835
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COMREG01          Roombo   Winny
COMREG02          Jayo     Benedicta
COMREG03          Trunyx   Raddy
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SEC01   Section1   Benito CH-0.0+0.2
SRID=4326;POLYGON((80.3346939086914 7.38610363006591,80.3370971679687
7.38538789749145,80.3366394042968 7.38375520706176,80.334373474121
7.38462400436401,80.3346939086914 7.38610363006591))
SEC02   Section2   Rochette   CH-0.2+0.4
SRID=4326;POLYGON((80.3370971679687 7.38538789749145,80.3398284912109
7.38503408432006,80.3396682739257 7.38339233398437,80.3366394042968
7.38375520706176,80.3370971679687 7.38538789749145))
SEC03   Section3   Aida   CH-0.4+0.6
SRID=4326;POLYGON((80.3398284912109 7.38503408432006,80.3422775268554
7.38495349884033,80.342185974121 7.38314723968505,80.3396682739257
7.38339233398437,80.3398284912109 7.38503408432006))
SEC04   Section4   Agneta CH-0.6+0.8
SRID=4326;POLYGON((80.3422775268554 7.38495349884033,80.3447341918945
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7.38314723968505,80.3422775268554 7.38495349884033))

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7.38452625274658,80.3370819091796 7.38460826873779,80.3371505737304
7.38490629196166))       SEC02   COMREG01        2023-04-30
BL02    6000    Feldsphathic Gneiss      SRID=4326;POLYGON((80.3419723510742
7.38417243957519,80.3418807983398 7.38370561599731,80.3410034179687
7.38378143310546,80.3419723510742 7.38417243957519))     SEC03   COMREG02
2023-01-31
BL03    120000  Charnokitic Gneiss       SRID=4326;POLYGON((80.3424606323242
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7.3834753036499,80.3424911499023 7.38367366790771,80.3424606323242
7.38423013687133))       SEC04   COMREG03        2023-02-28
BL04    45000   Garnert Biotite Gneiss  SRID=4326;POLYGON((80.3440170288085
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CON01    7822970086        COMREG01
CON02    2023304131        COMREG01
CON03    2314096704        COMREG02
CON04    8679740609        COMREG02
CON05    4781977144        COMREG03
CON06    2414450676        COMREG03
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RD03   BL01
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