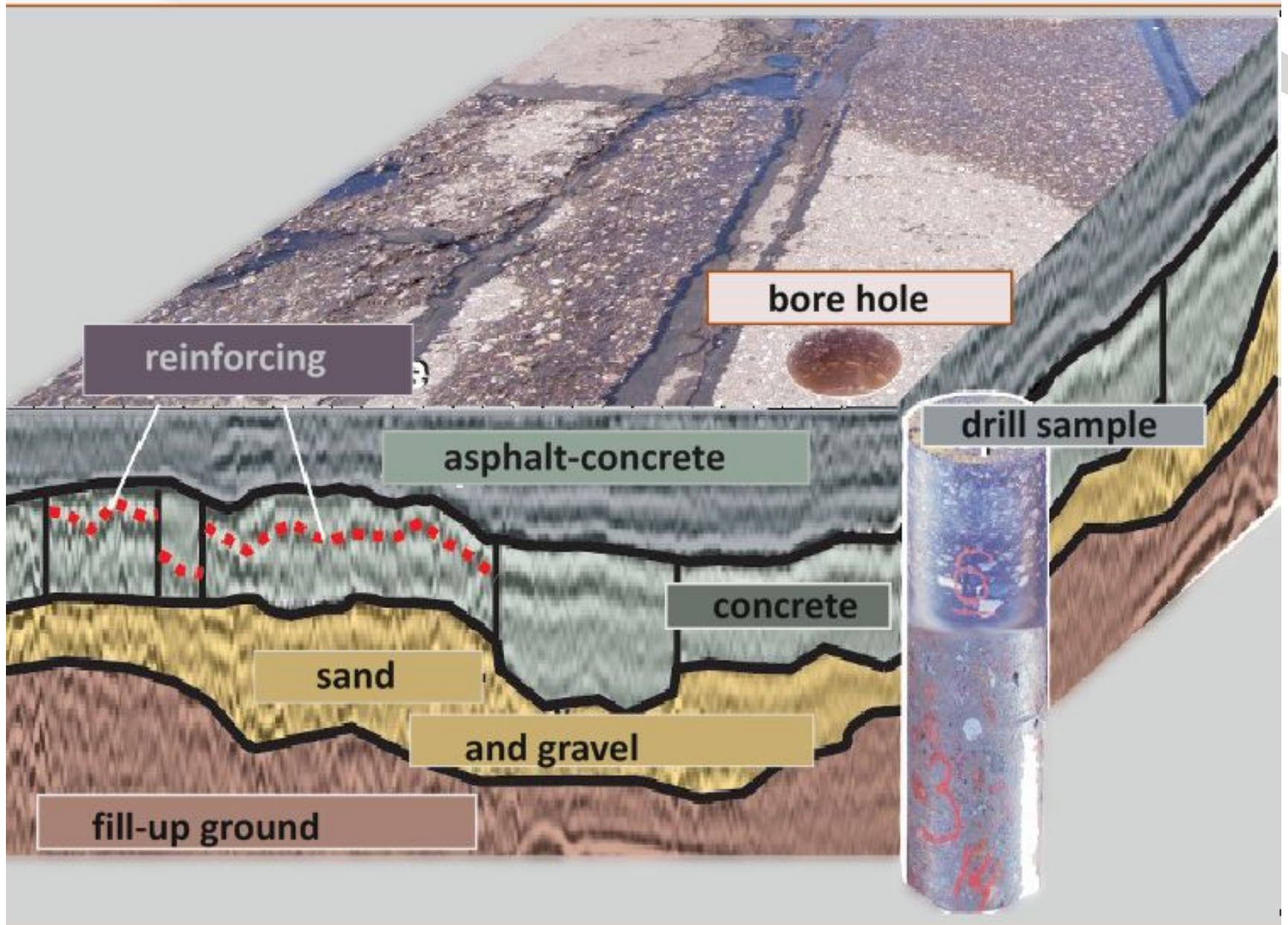


GEOPHYSICAL SURVEY GEOPHYSICAL EQUIPMENT



- determination of the thickness of pavement layers;
- identification of subsidence and flooded areas;
- monitoring the condition of the road pavement.







Antenna AB-400R



Antenna AB-2000R





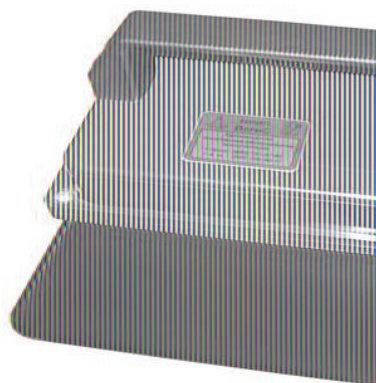
AB-1000R



AB-400R



AB-2000R



AB-1700R



AB-2500R

Antenna	Maximum Depth, m	Resolution, m
AB-400P (400 MHz)	3	0,1
AB-1000P (1000 MHz)	1,5	0,04
AB-1700P (1700 MHz)	0,8	0,03
AB-2000P (2000 MHz)	0,6	0,02
AB-2500P (2500 MHz)	0,4	0,015



Antenna AB-2000R

The distance between the surface and antenna 20 cm,
Depth 0,6 м.
Resolution 0,02 м.



Antenna AB-400R

The distance between the surface and antenna 30 - 40 см,
Depth 3,0 м.
Resolution 0,1 м.



Antenna AB-1000R

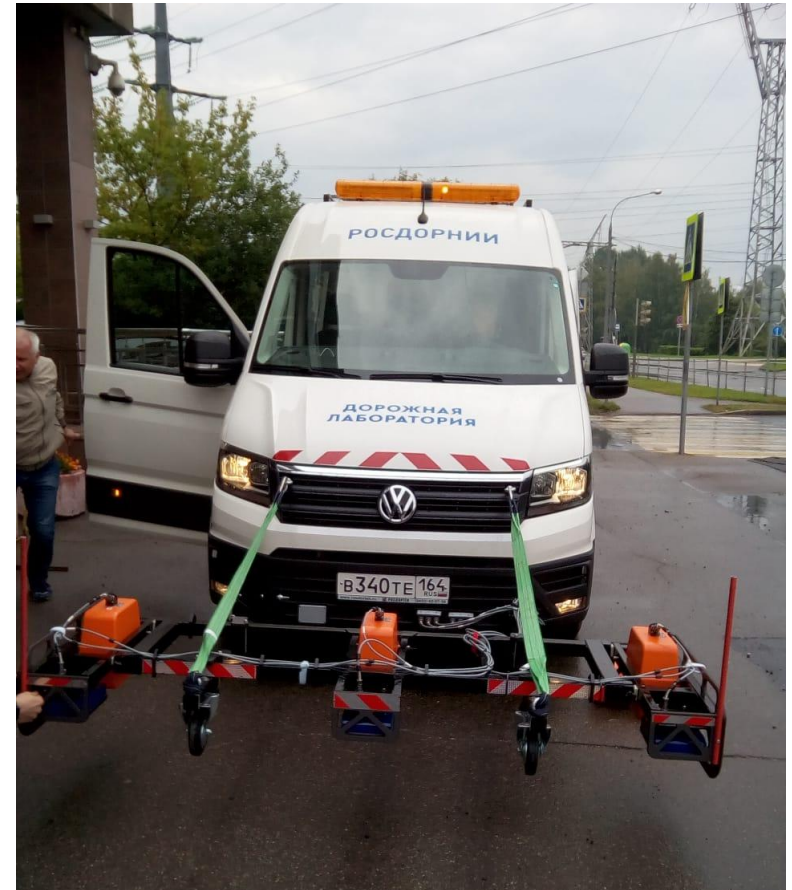
The distance between the surface and antenna 30-40 см,
Depth 1,5 м.
Resolution 0,04 м.

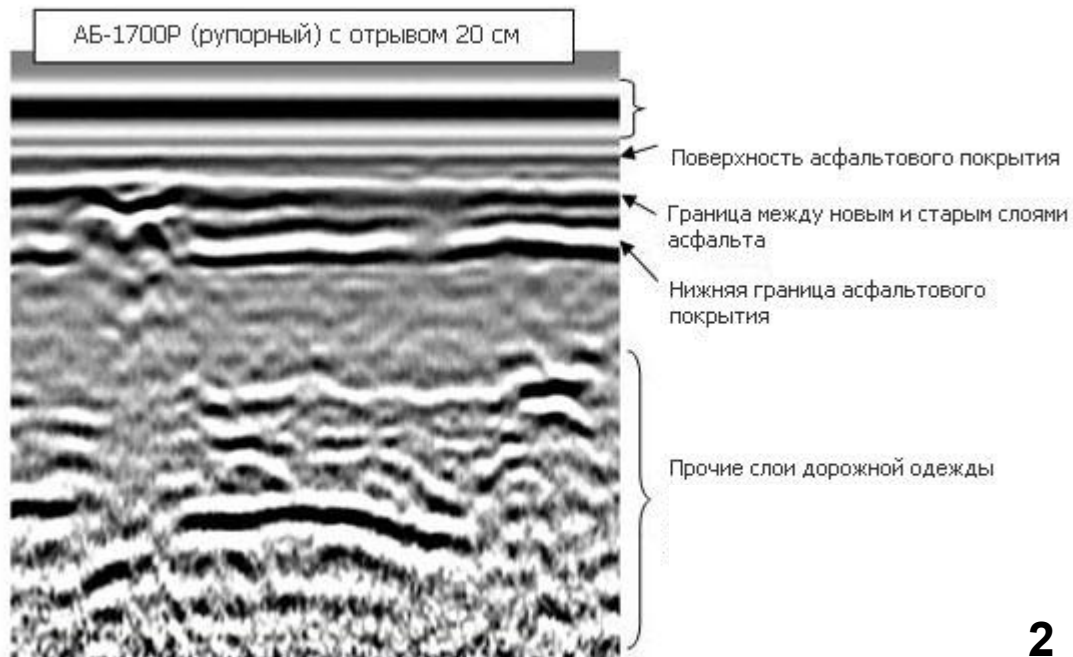
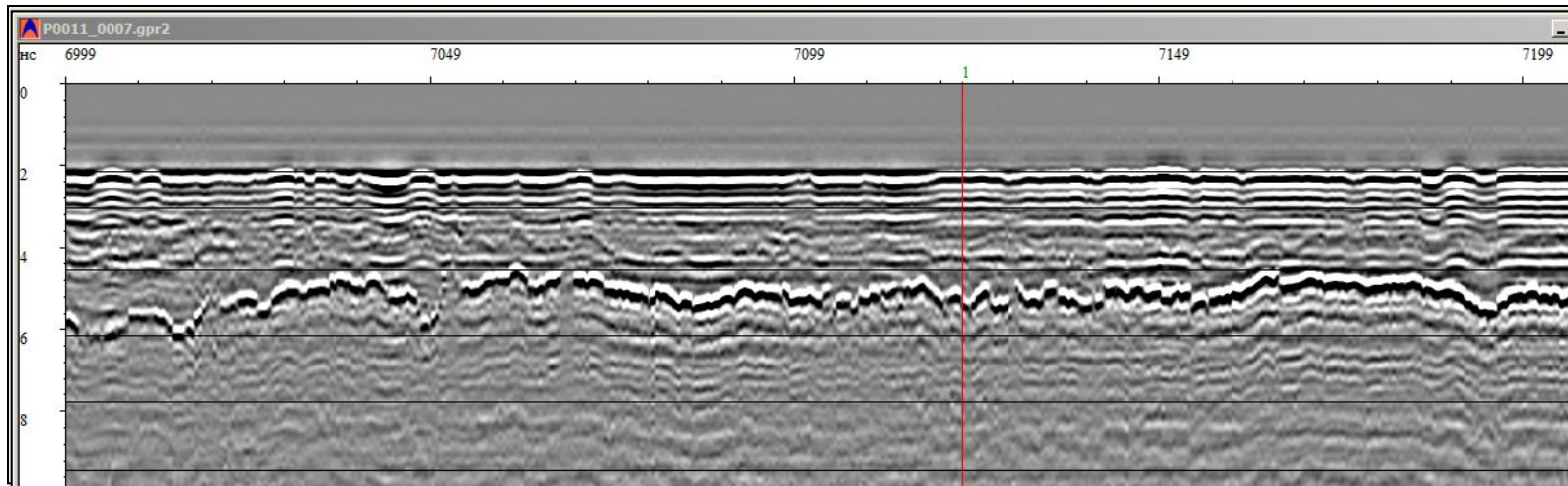
Frequency	Depth	Resolution
2000 MHz	0,6 m	2 cm
1700 MHz	0,8 m	3 cm
1000 MHz	1,5 m	4 cm
400 MHz	3 m	10 cm

**The speed of survey -
up to 80 km/hour**

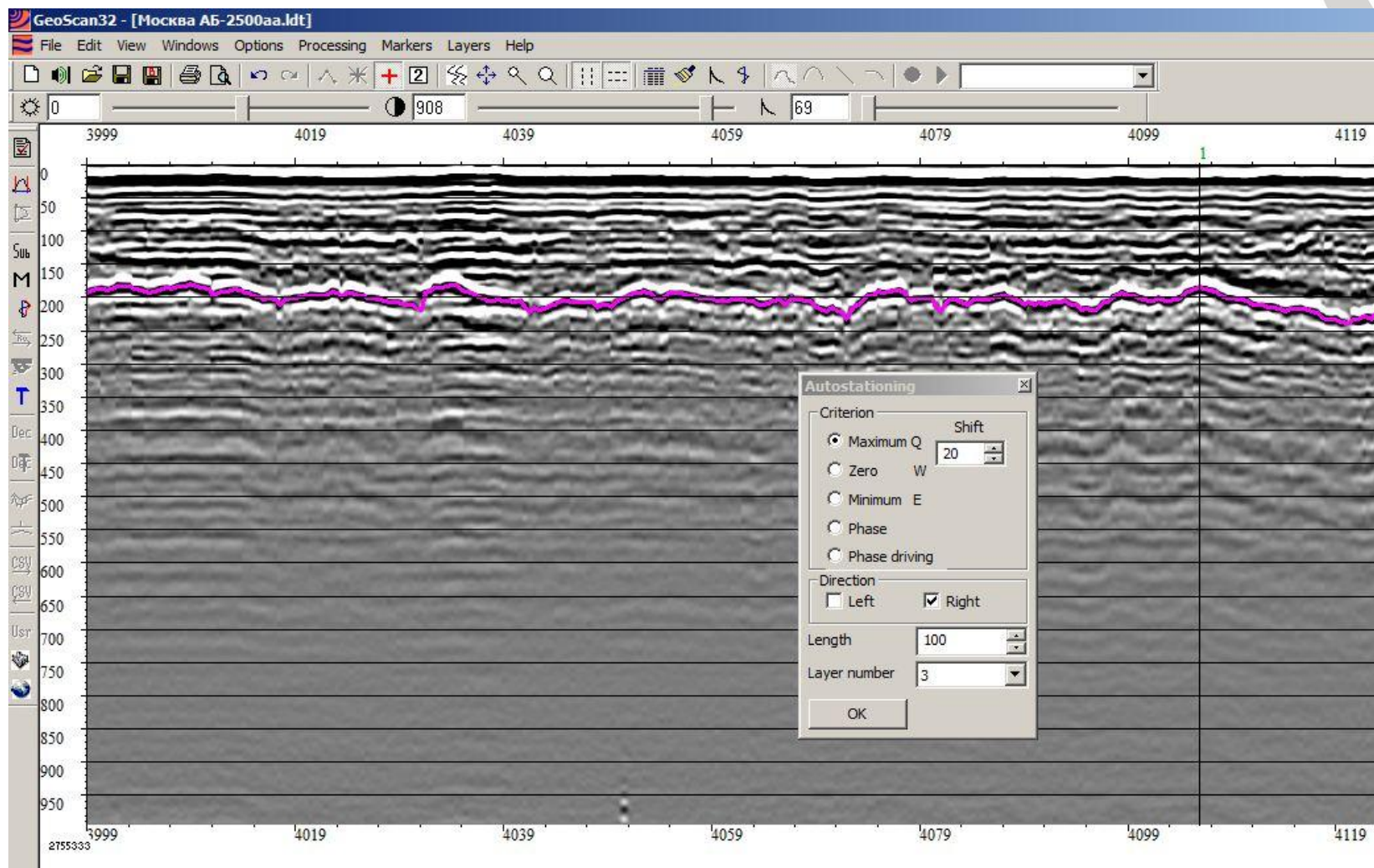


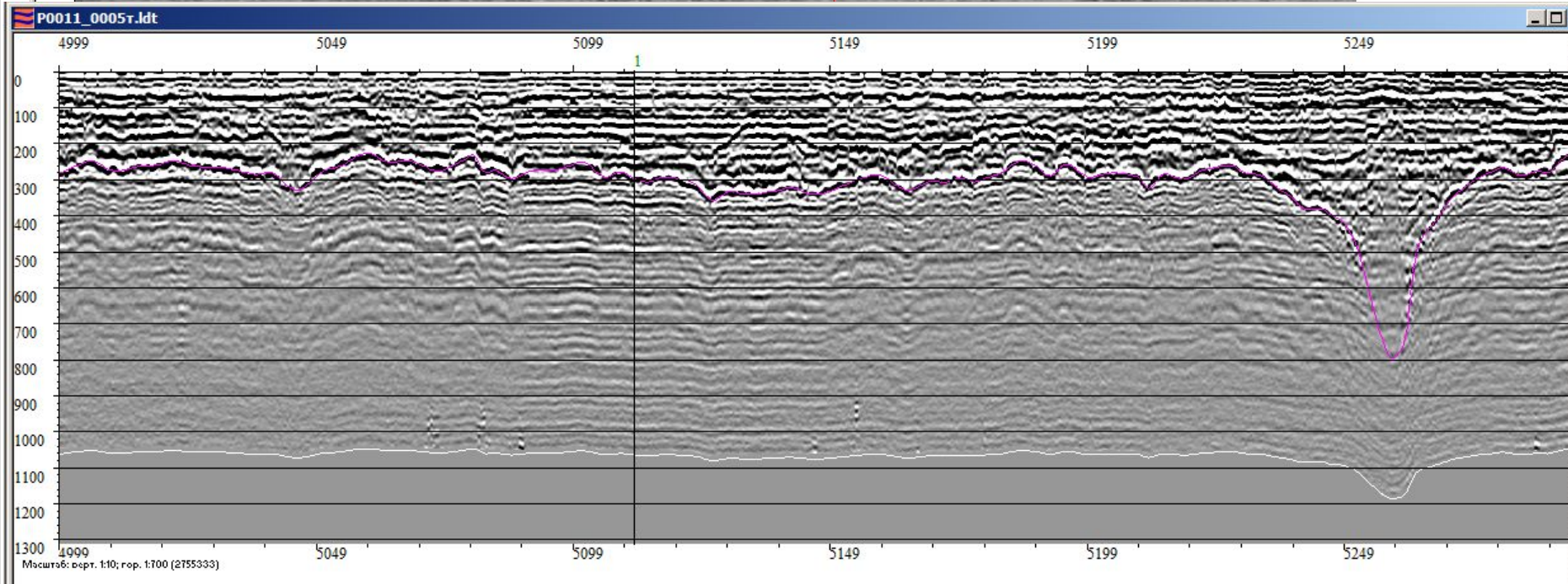
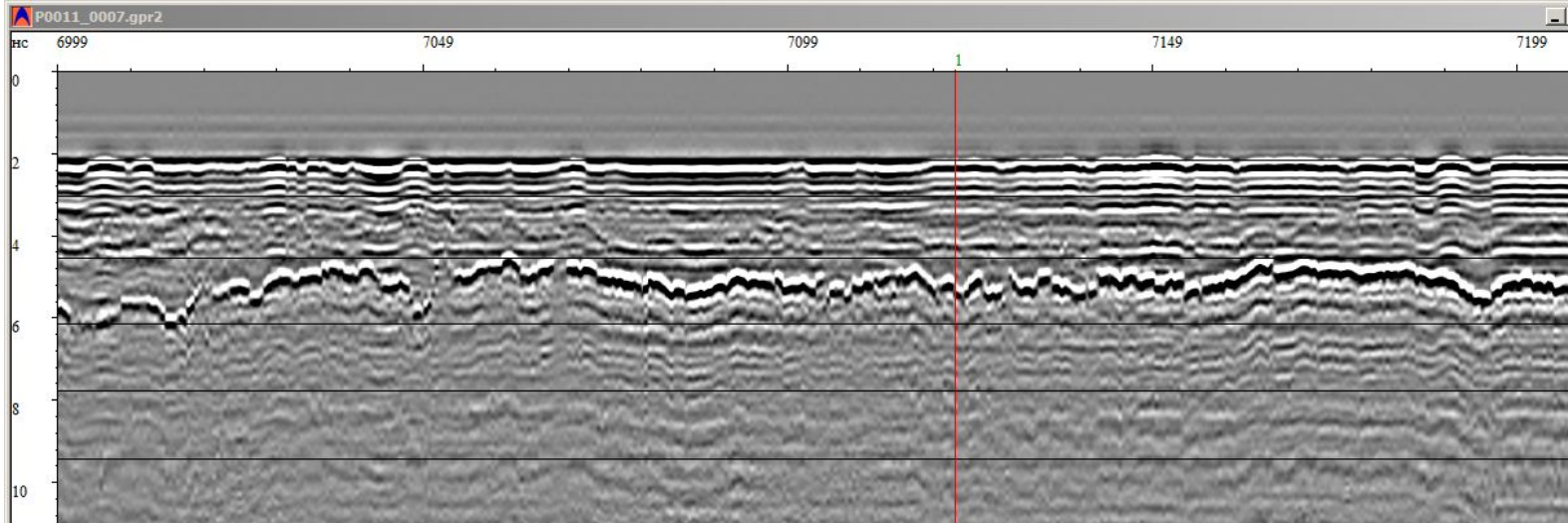
**Dual channels or
Six-channel mode**





GeoScan32 Software





Автотрассировка асфальта

Участок дороги: Red place

Стартовая точка: 0 км 0 м

Направление движения: Вперед Назад

Зона поиска

Верхний слой			Нижний слой		
Top	4.0	нс	Top	6.0	нс
Bottom	6.0	нс	Bottom	12.0	нс

по максимуму по минимуму Глобально

Допустимая толщина

Минимальная толщина слоя: 1 см

Максимальная толщина слоя: 21 см

Интервал записи отчета: 1.00 м

Запись

Тип файла: HTML XLS

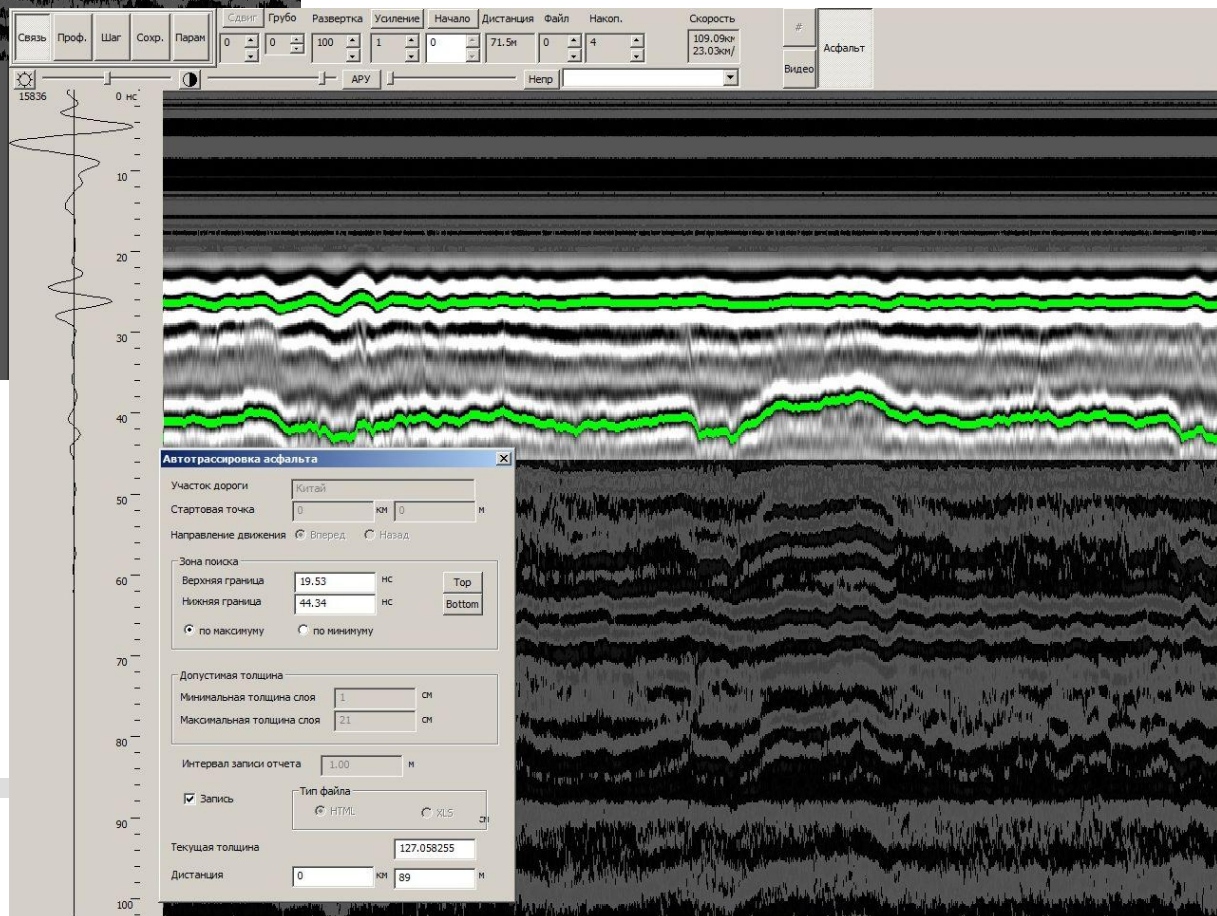
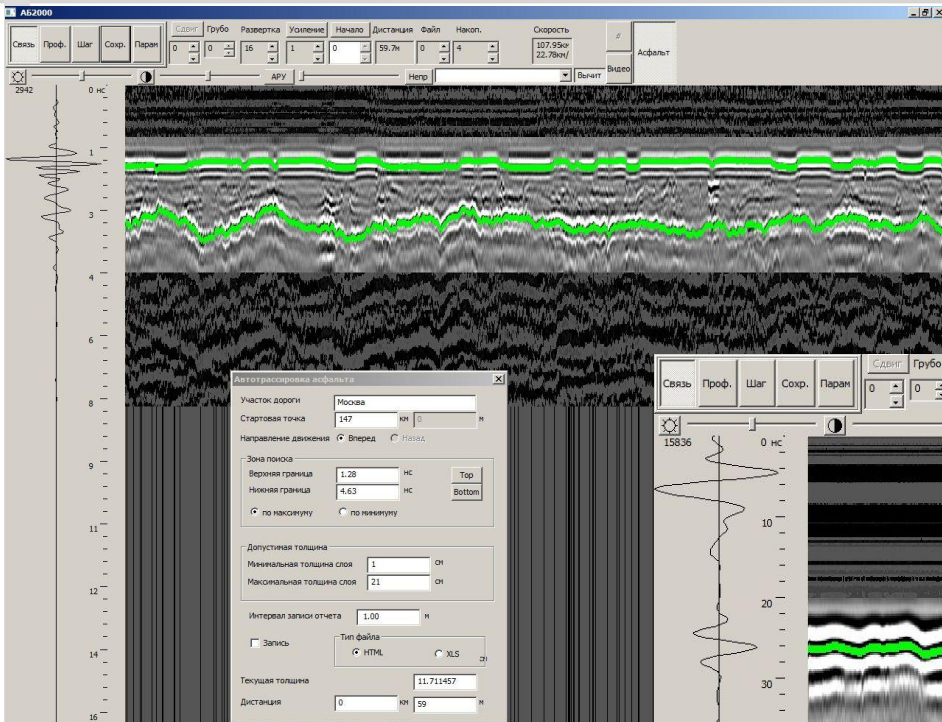
Калибровать Использовать калибровку

Скорость э/м волны: 14.1 см/нс

Текущая толщина: 0 см

Дистанция: 0 км 0 м

- measurement of the thickness of the top layer in real time,
- automatic selection of anomalous areas (less, more than the design thickness),
- formation of results in the form of a table



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Название проекта: Десантная улица

Строительство блока:

Научный руководитель:

Структурное имя слоя:	Поверхность асфальта	Средняя толщина (см)	15.67	Стандартное отклонение	1.85
Толщина представительное значение (см)	0.00	Конструкционная толщина (см)	0.00	Вывод	

Доля	Толщина (см)	Точное расстояние (м)	Доля	Толщина (см)	Точное расстояние (м)	Доля	Толщина (см)	Точное расстояние (м)
K7+-221	15.69	6779	K7+390	15.69	7390	K7+700	17.68	7700
K7+-220	17.01	6780	K7+400	15.91	7400	K7+710	16.57	7710
K7+100	19.00	7100	K7+410	15.69	7410	K7+720	15.03	7720
K7+110	16.35	7110	K7+420	15.03	7420	K7+730	15.25	7730
K7+120	17.24	7120	K7+430	17.90	7430	K7+740	12.15	7740
K7+130	17.01	7130	K7+440	15.03	7440	K7+750	11.49	7750
K7+140	16.13	7140	K7+450	15.69	7450	K7+760	14.36	7760
K7+150	16.13	7150	K7+460	17.46	7460	K7+770	11.27	7770
K7+160	20.33	7160	K7+470	16.13	7470	K7+780	11.49	7780
K7+170	18.12	7170	K7+480	15.03	7480	K7+790	13.48	7790
K7+180	16.13	7180	K7+490	14.81	7490	K7+800	15.25	7800
K7+190	15.25	7190	K7+500	13.26	7500	K7+810	15.03	7810
K7+200	11.49	7200	K7+510	11.71	7510	K7+820	14.36	7820
K7+210	13.92	7210	K7+520	15.69	7520	K7+830	16.35	7830
K7+220	12.82	7220	K7+530	14.36	7530	K7+840	15.91	7840
K7+230	15.03	7230	K7+540	14.81	7540	K7+850	14.81	7850
K7+240	11.27	7240	K7+550	15.03	7550	K7+860	16.13	7860
K7+250	11.27	7250	K7+560	16.35	7560	K7+870	16.13	7870
K7+260	15.69	7260	K7+570	15.91	7570	K7+880	16.79	7880
K7+270	15.47	7270	K7+580	17.90	7580	K7+890	15.69	7890
K7+280	14.81	7280	K7+590	16.79	7590	K7+900	17.90	7900
K7+290	14.14	7290	K7+600	16.79	7600	K7+910	16.35	7910
K7+300	15.47	7300	K7+610	18.78	7610	K7+920	15.91	7920
K7+310	17.01	7310	K7+620	18.78	7620	K7+930	15.47	7930
K7+320	16.35	7320	K7+630	18.34	7630	K7+940	14.58	7940



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AUTOMATIC PROCESSING PROGRAM "Analysis 7"

- **Determination of soil heterogeneity and structural layers, pavement.**
- **Acceleration of the processing of GPR data (automatic processing of radarograms)**
- **Saving data in a data format compatible with professional geophysical programs for detailed study of special places**
- **There is a set of tools for self-analysis by manual methods**
- **Saving data in the form of pictures and tables with layer thicknesses**



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Анализ 7 (x64) - F:\ГЕОТЕХ\12-2019-ЦКАД-3\цкад3\Р0000_0003.gpr2

Файл Проект Правка Вид Обработка Анализ Настройка

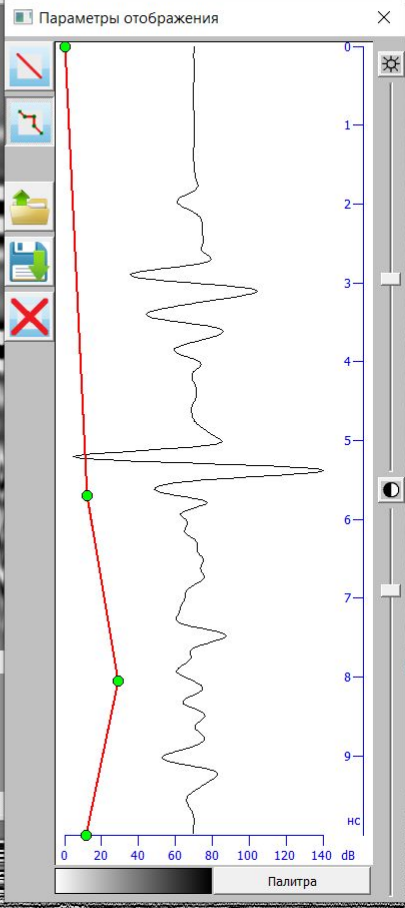
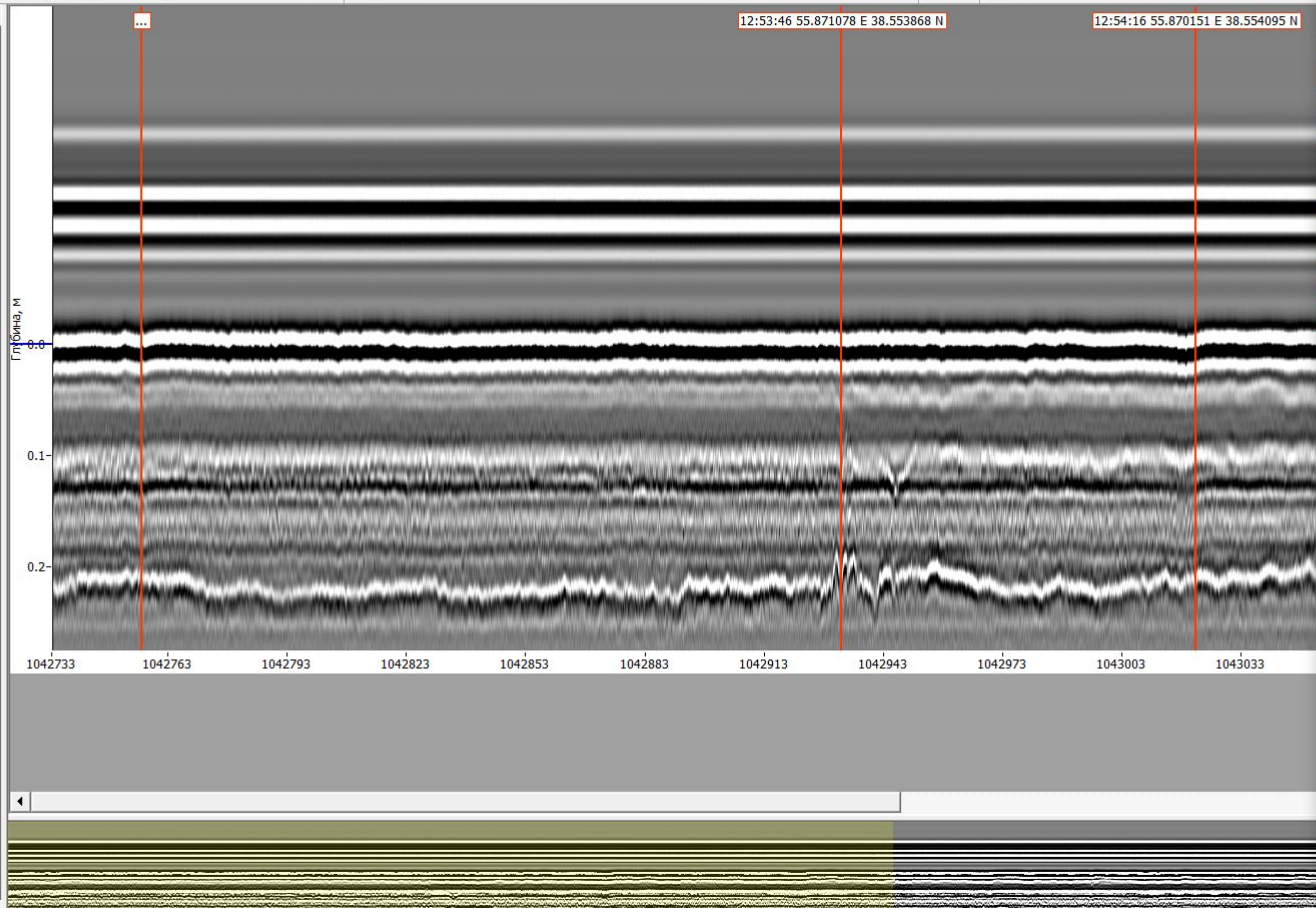


55.872930 38.553234 x=1042746.23 h=0.26

Проект

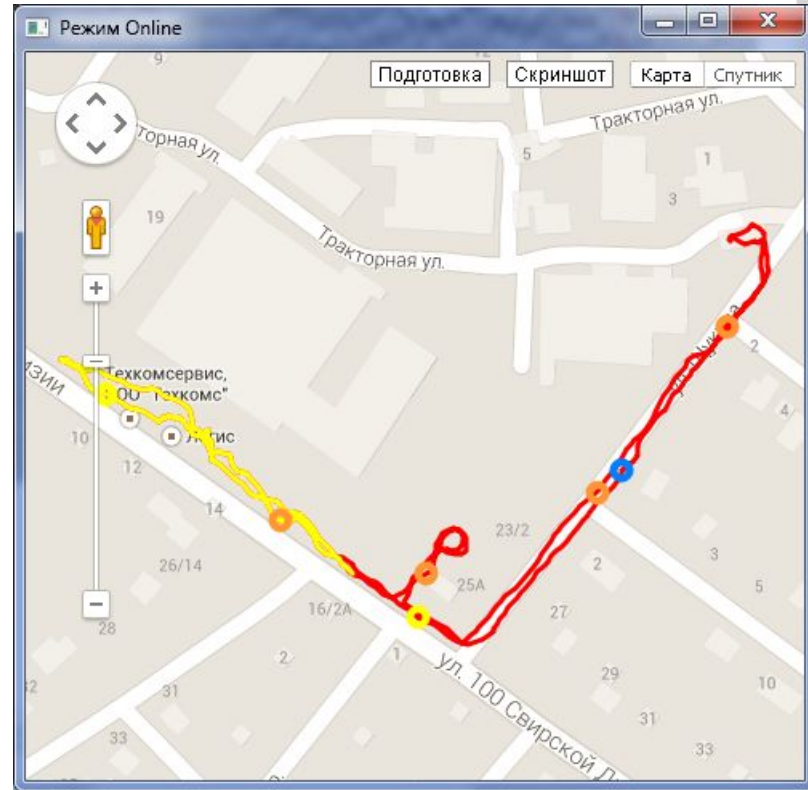
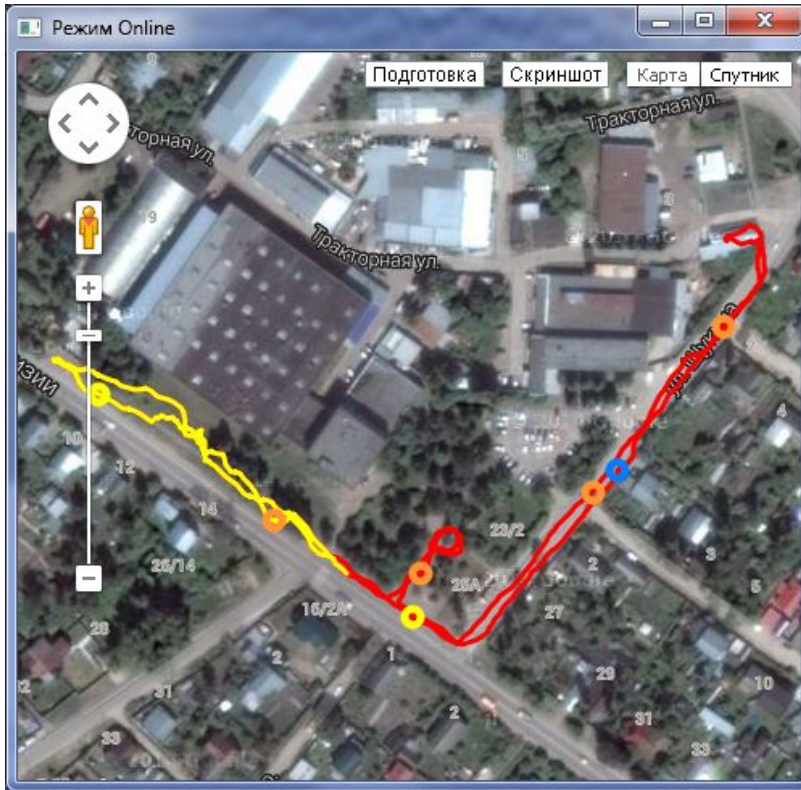
Новый проект

Проект Каналы



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You can choose the type of display: map or satellite image. You can display a radarogram in any part of the route, allows you to view panoramas at a selected point on the route



Настройка анализа слоев

Описание	Мин.толщина, м	Макс.толщина, м	Добавить
Асфальт	0.1	0.3	Удалить
Асфальт	0.05	0.11	Изменить
Щебень	0.05	0.1	Загрузить
Песок	0.4	0.5	Сохранить

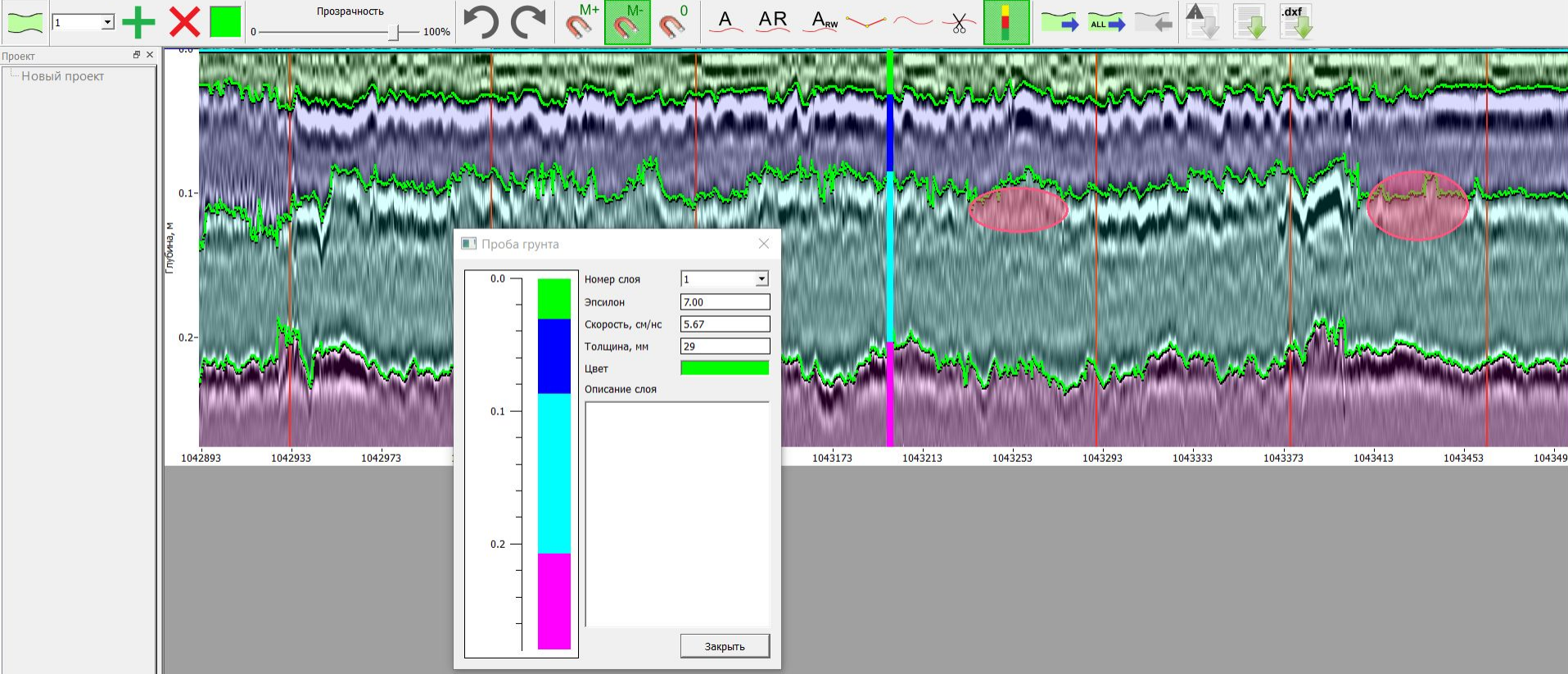
Ok
Отмена

Анализ 7 (x64) - F:\ГЕОТЕХ\12-2019-ЦКАД-3\цкад3\Р0000_0003.gpr2

Файл Проект Правка Вид Обработка Анализ Настройка

55.871343 38.553806

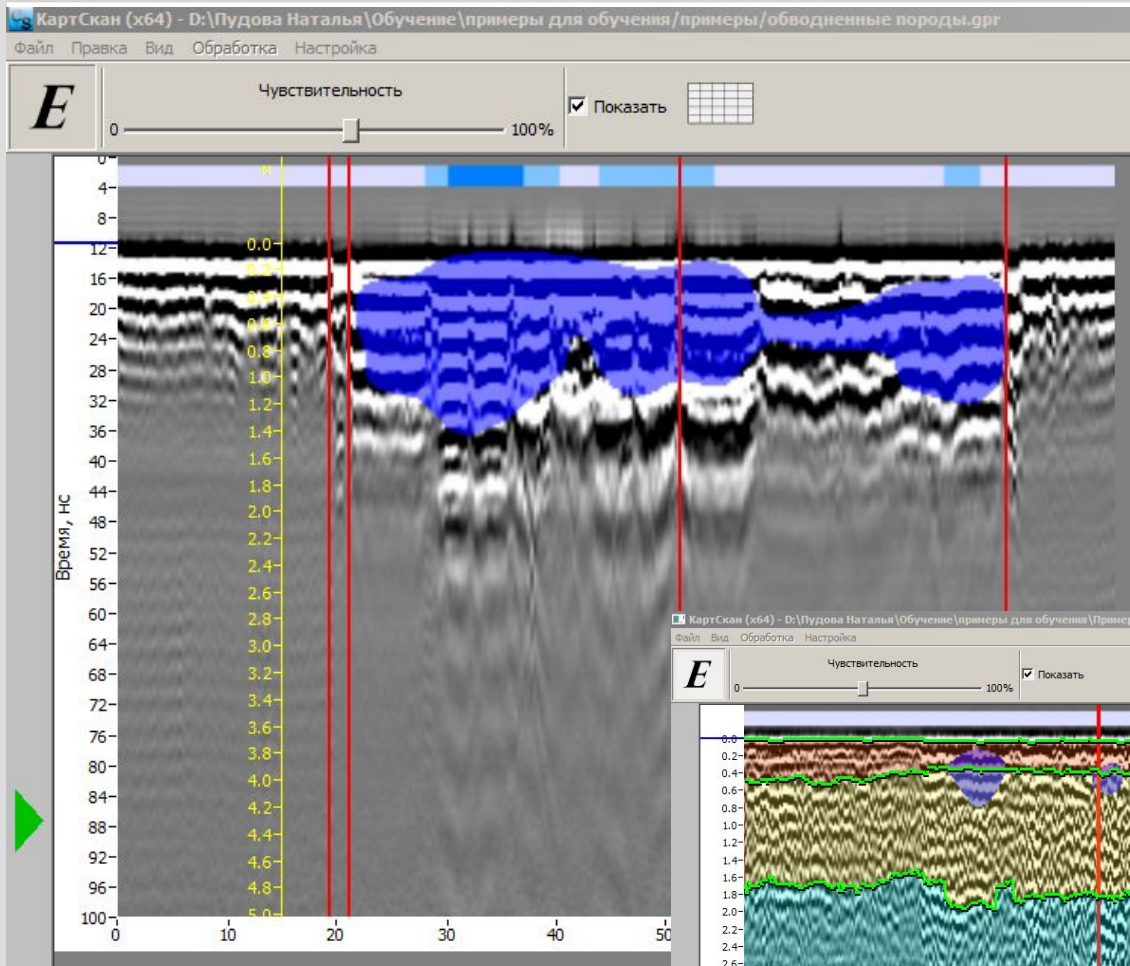
x=1042905.54 h=0.26



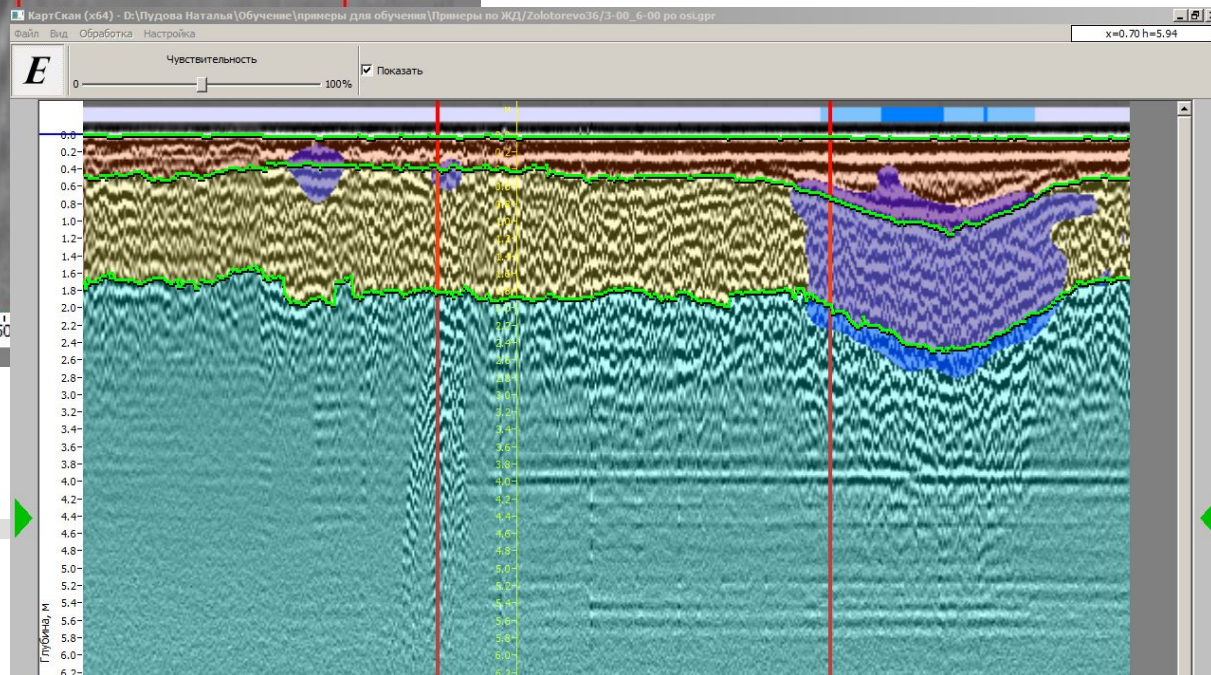
Comparison with drilling data. Determination of the dielectric constant of each layer based on drilling data..

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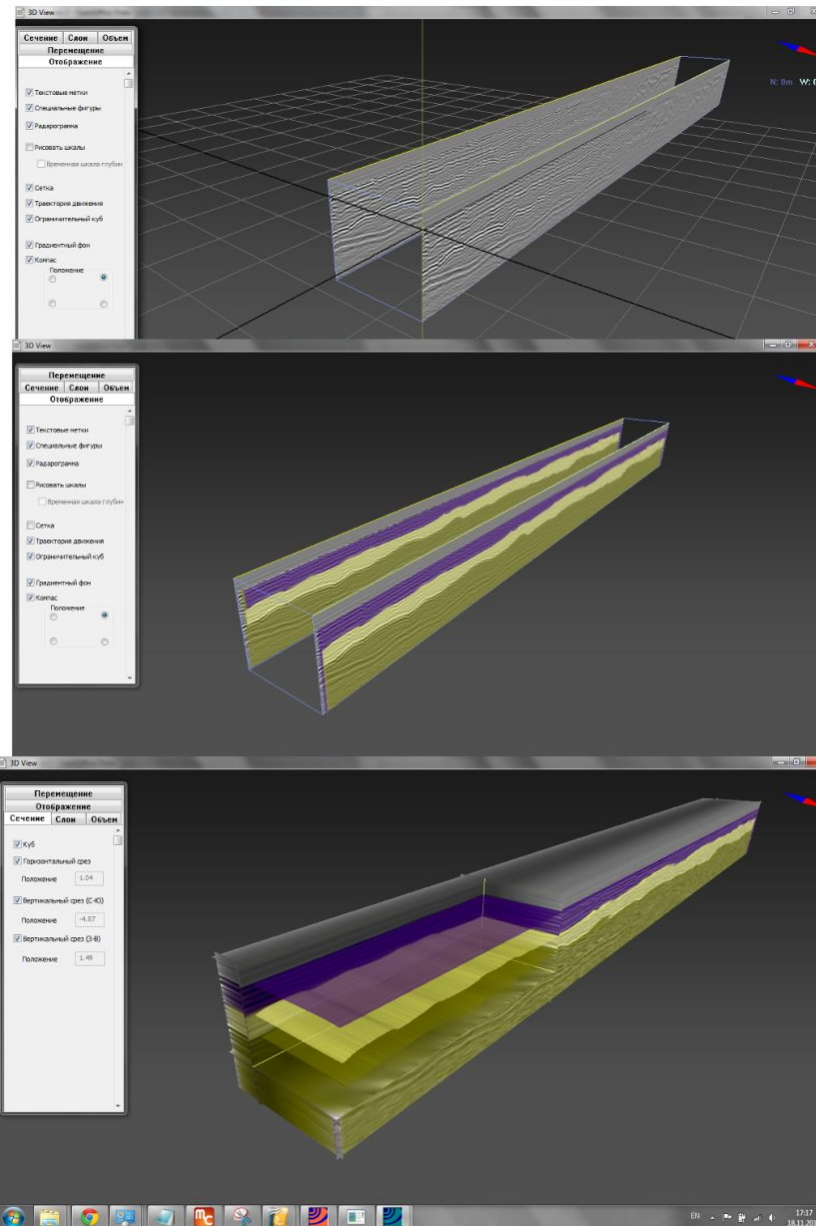
- allows you to mark the places of high humidity on the radarogram. Moisture analysis can be performed simultaneously for several channels (interpretation of sounding results by several antenna units).
- The analysis results are displayed in the lower part of the radarogram in the form of colored bars.

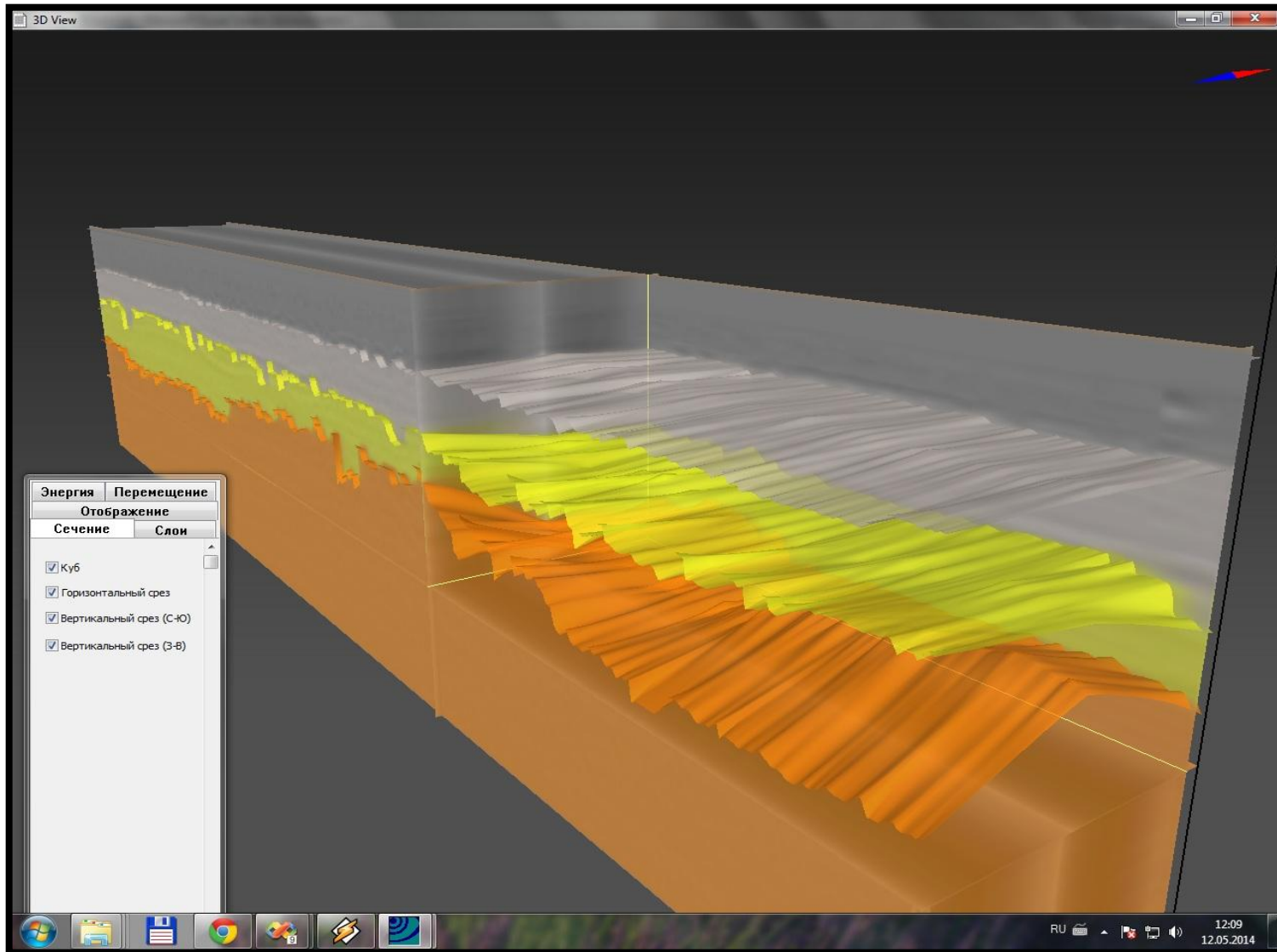


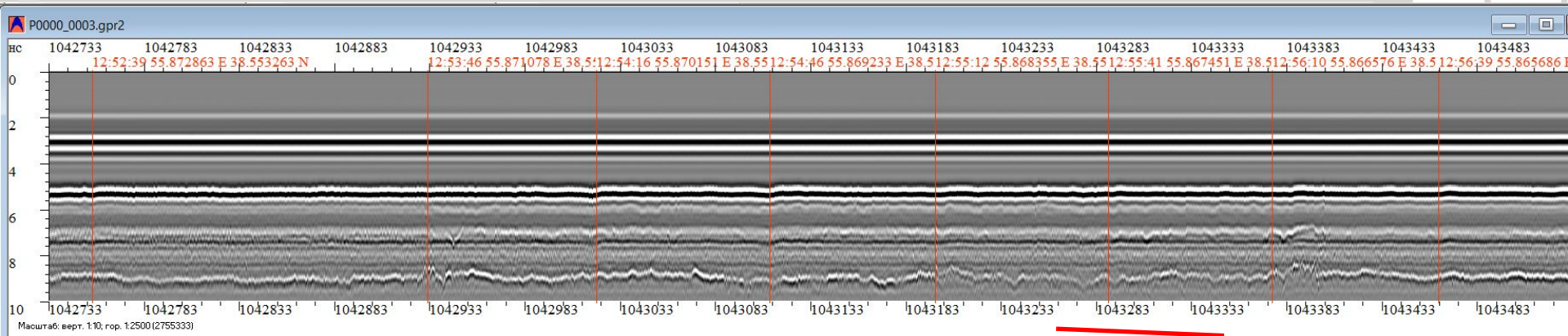
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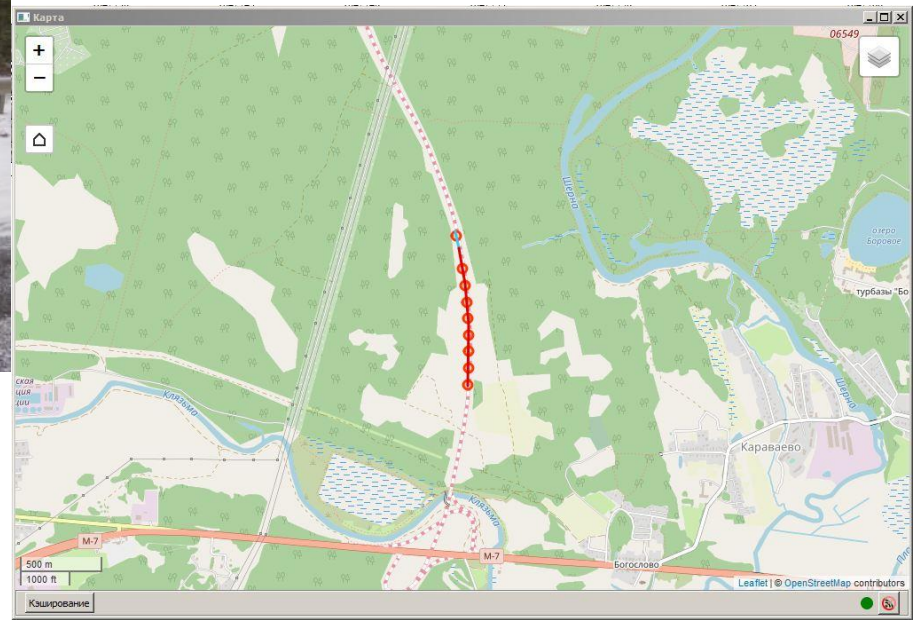
Radarogramma (November 2019r)

Signal reflected from the road surface

Signals reflected from the lower boundary of the asphalt concrete

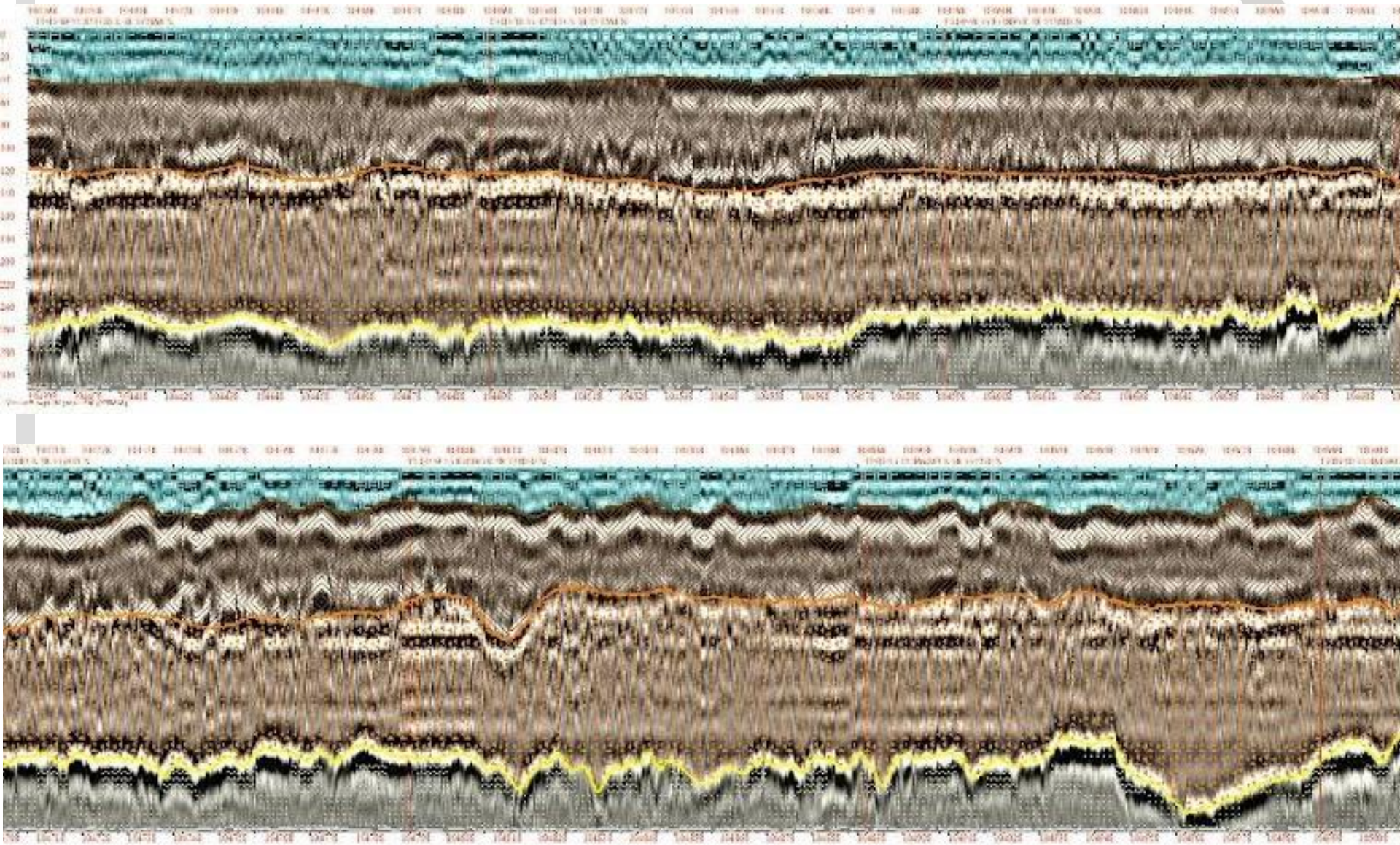


Car with AB-2000R for sounding (November 2019)

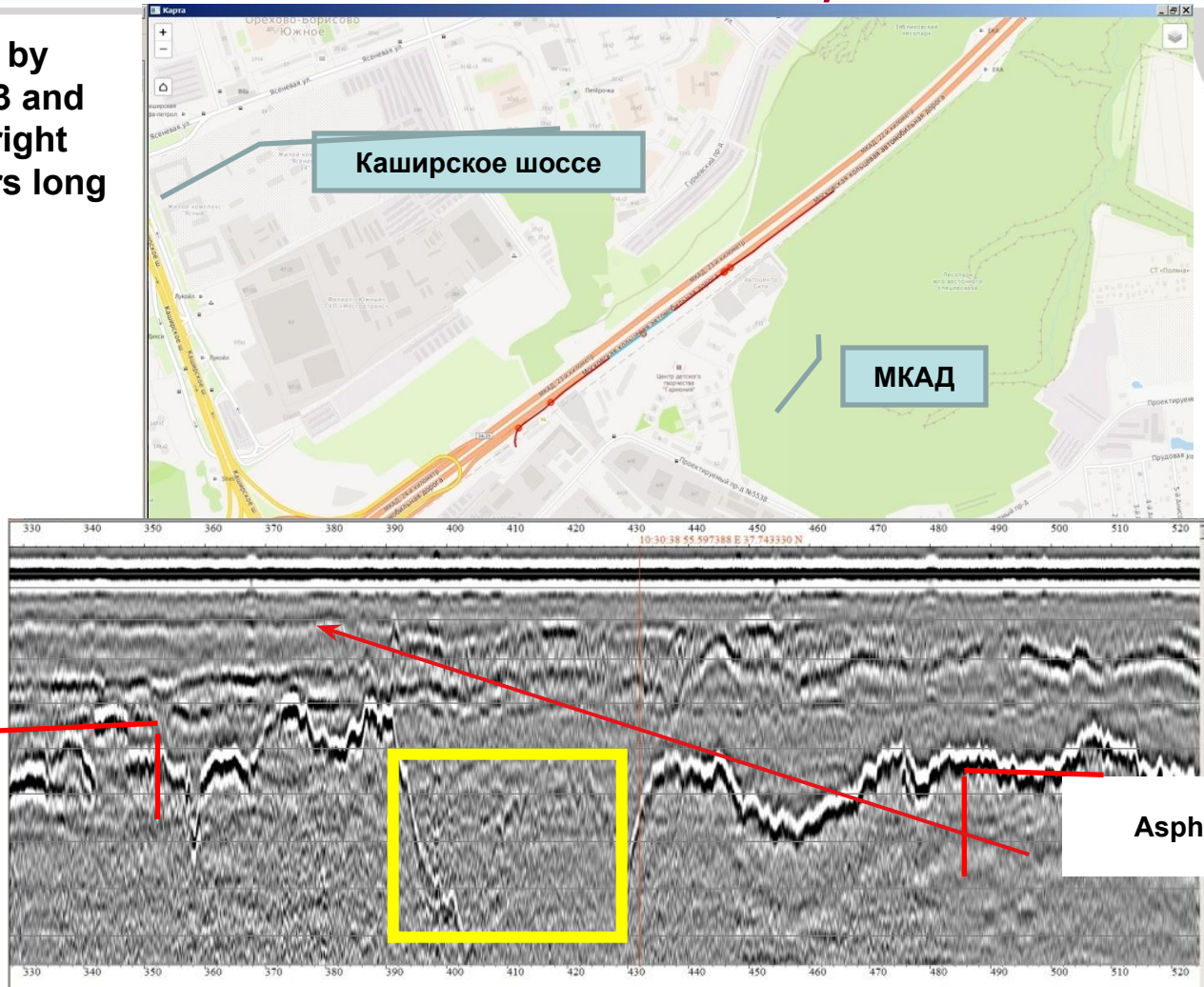




The result of auto-picking of pavement layers in the Analysis 7 software



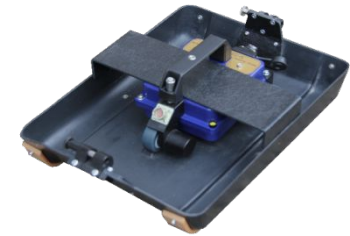
Georadar survey by antenna AB-1000R3 and AB2000R3 of the right shoulder 1000 meters long



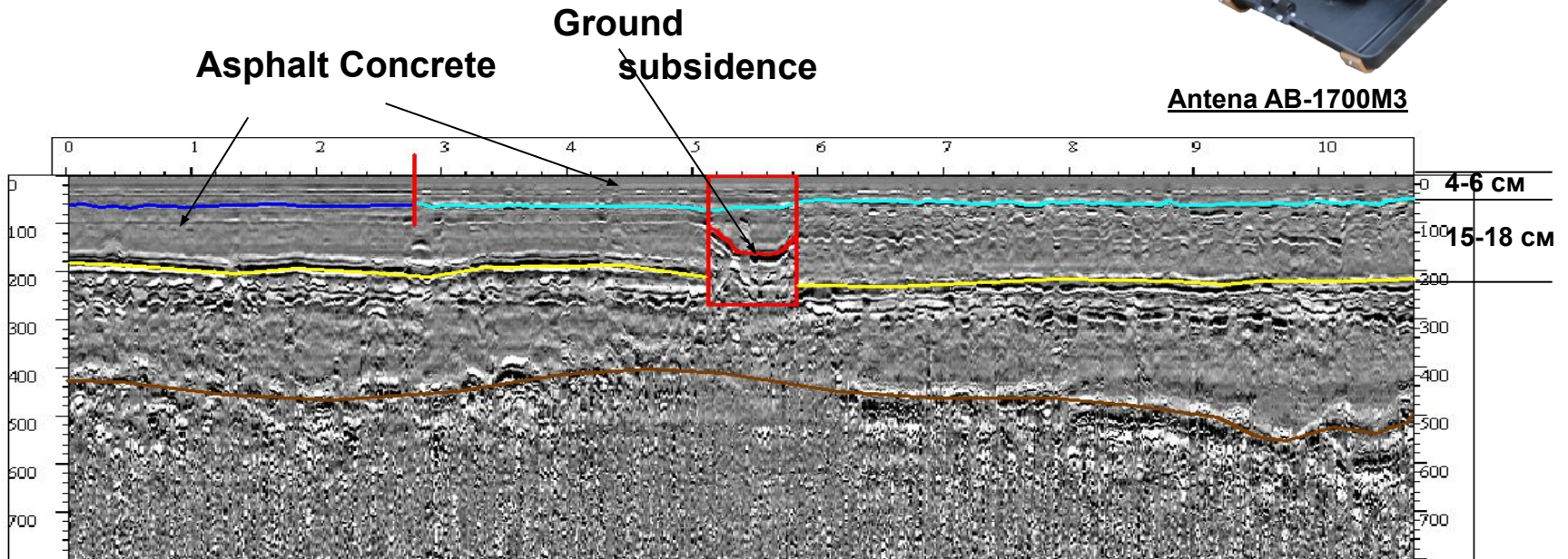
- definition of pavement structure
- identification of hidden defects
- determination of the type of cracks

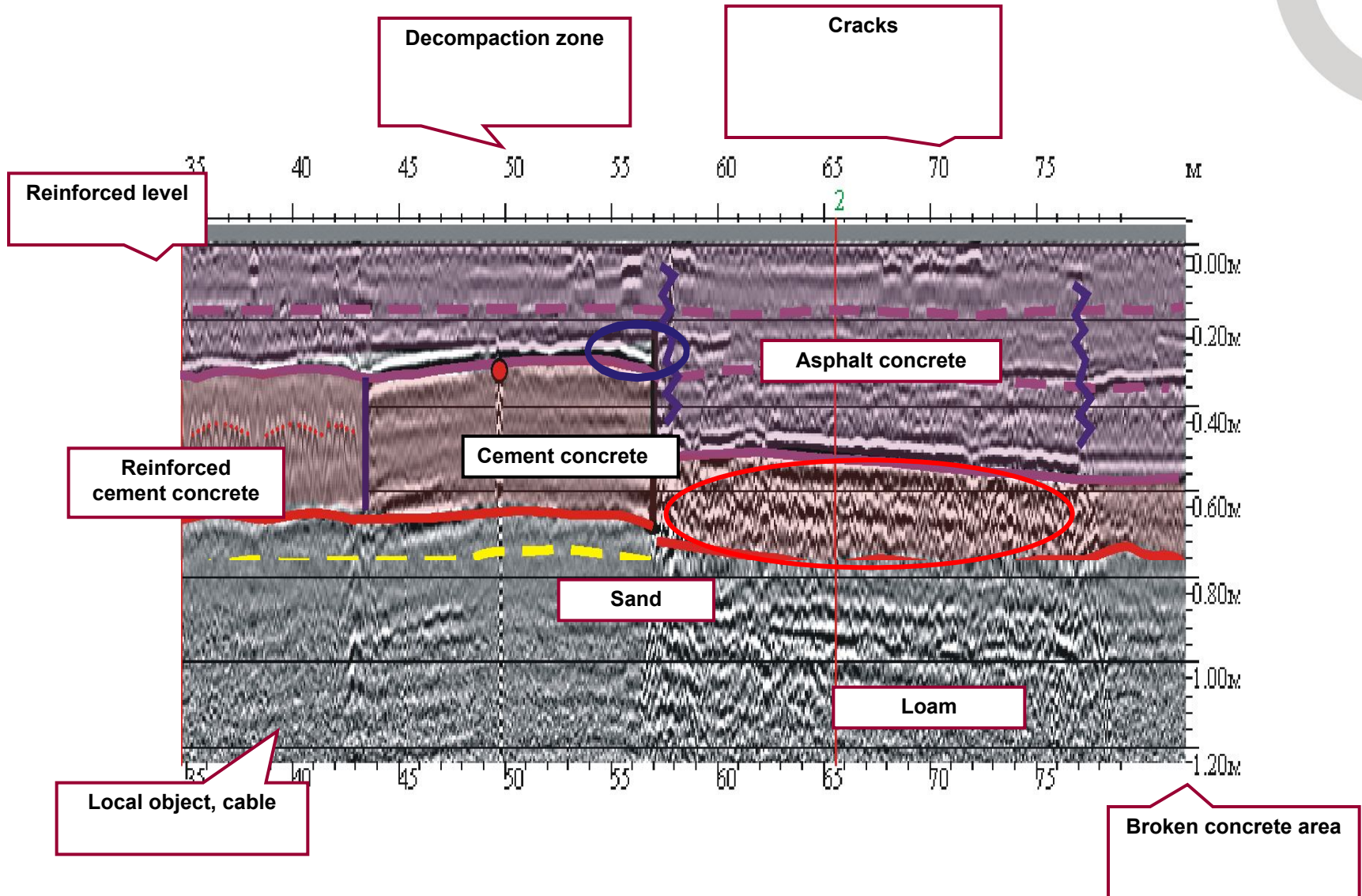


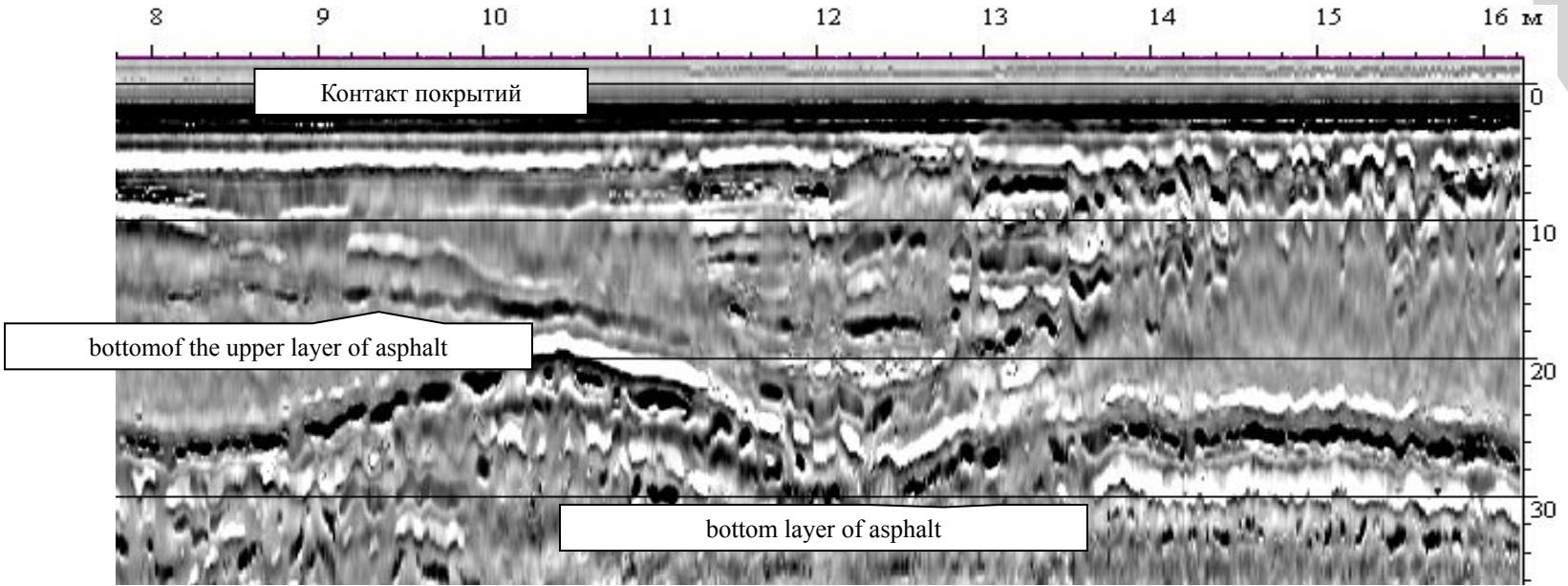
Antenna AB-700M3



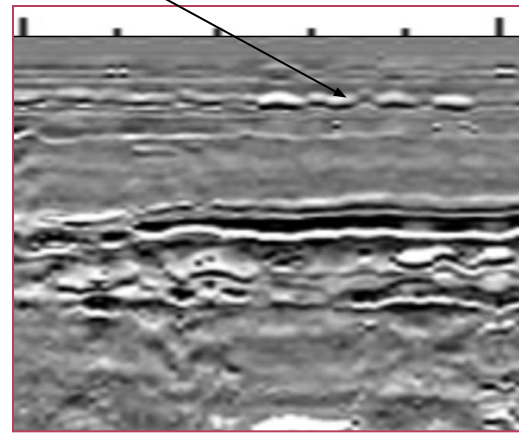
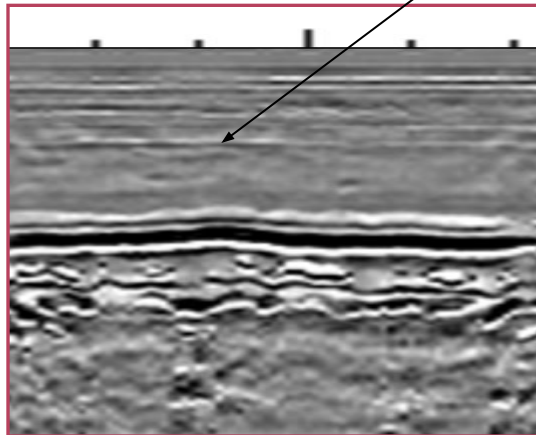
Antenna AB-1700M3







Asphalt concrete layer boundary

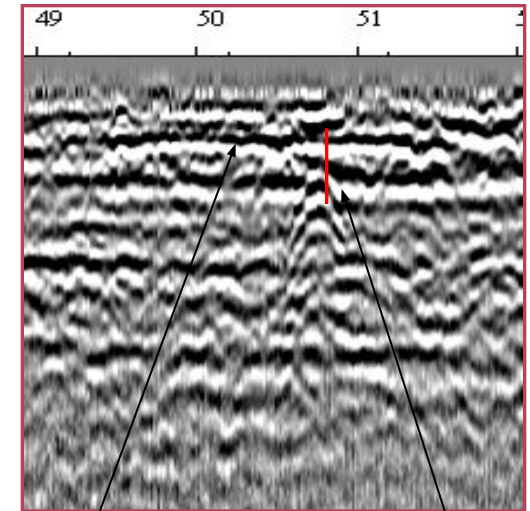
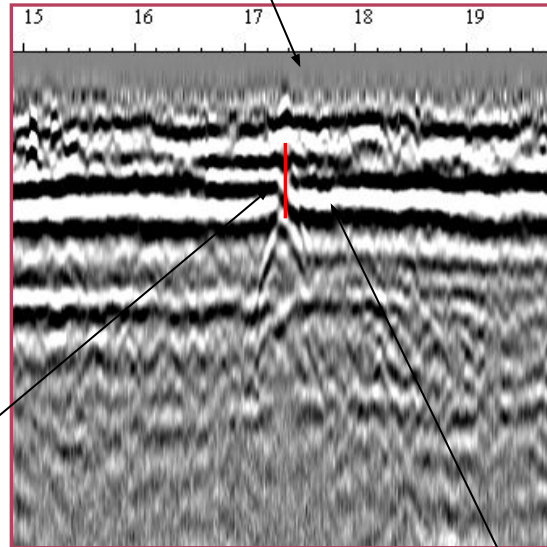
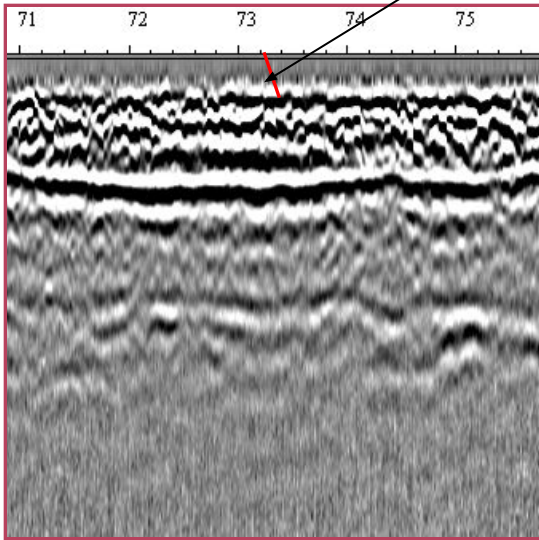


Surface crack

Reflected cracks

Hidden crack

Crack location on the surface



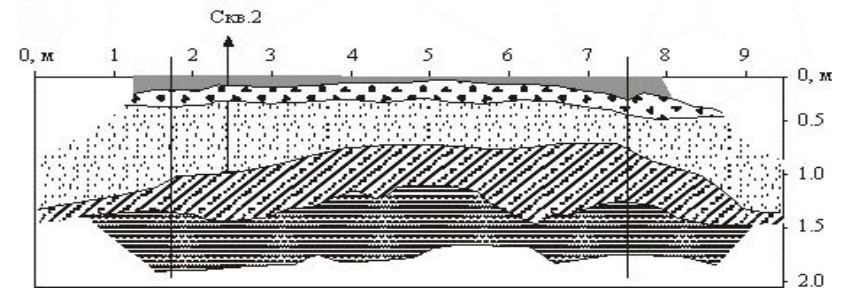
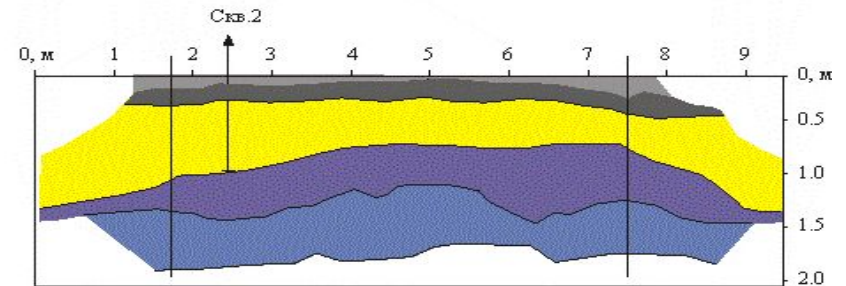
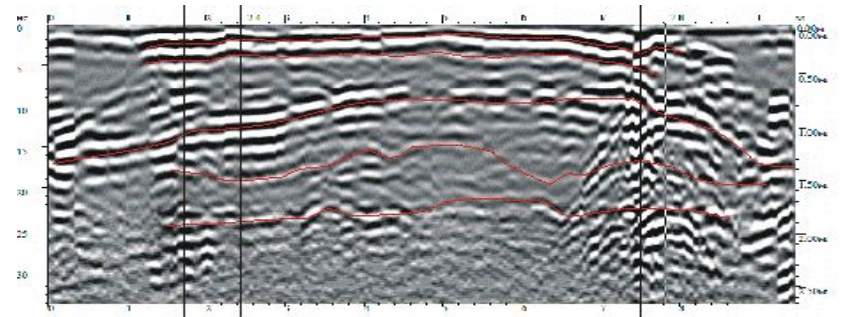
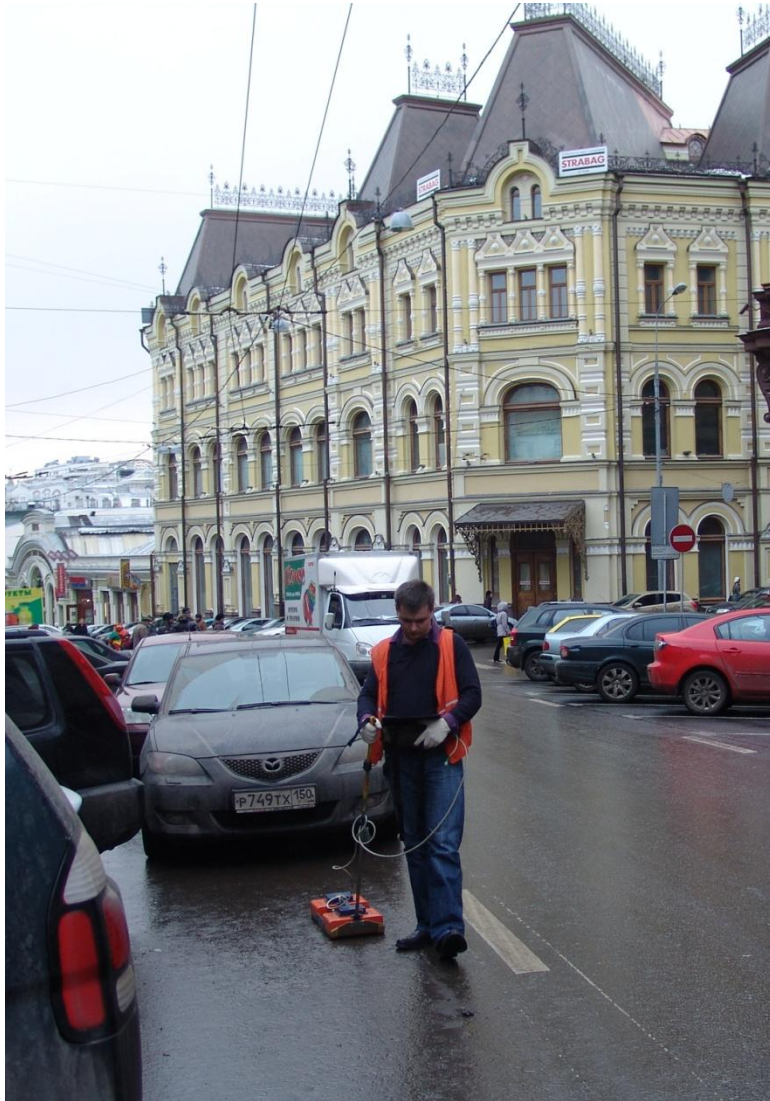
**Reflection from a crack
in the lower layer of
asphalt concrete**

**Reflection from a
crack in the lower
layer of asphalt
concrete**

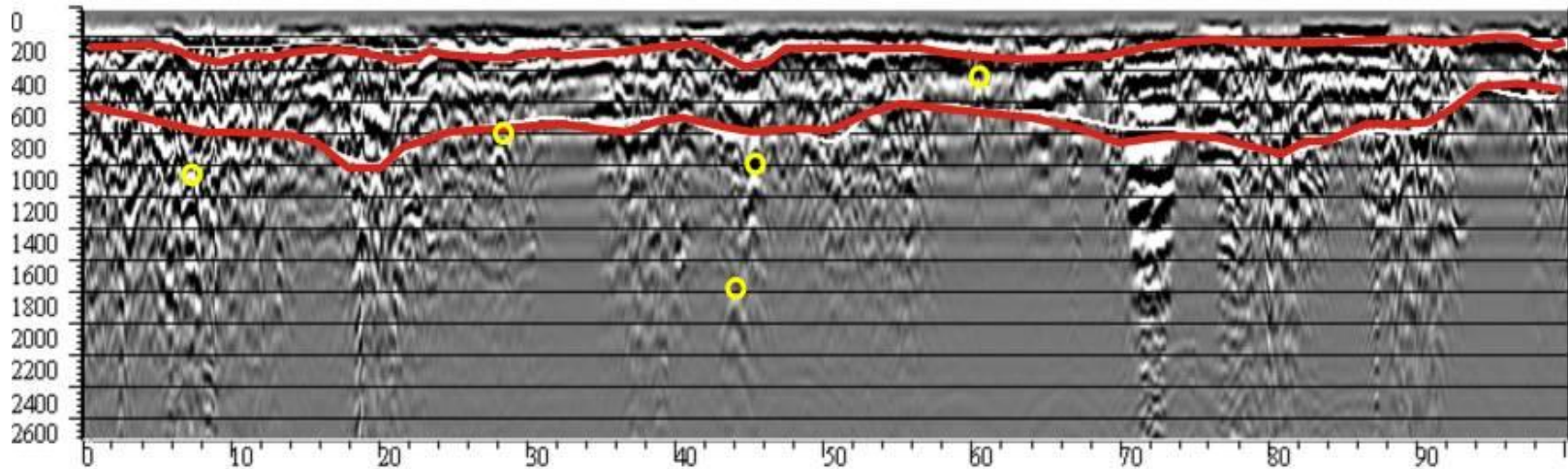
**Asphalt concrete
bottom boundary**

Moscow Roads, 2008 – 2013

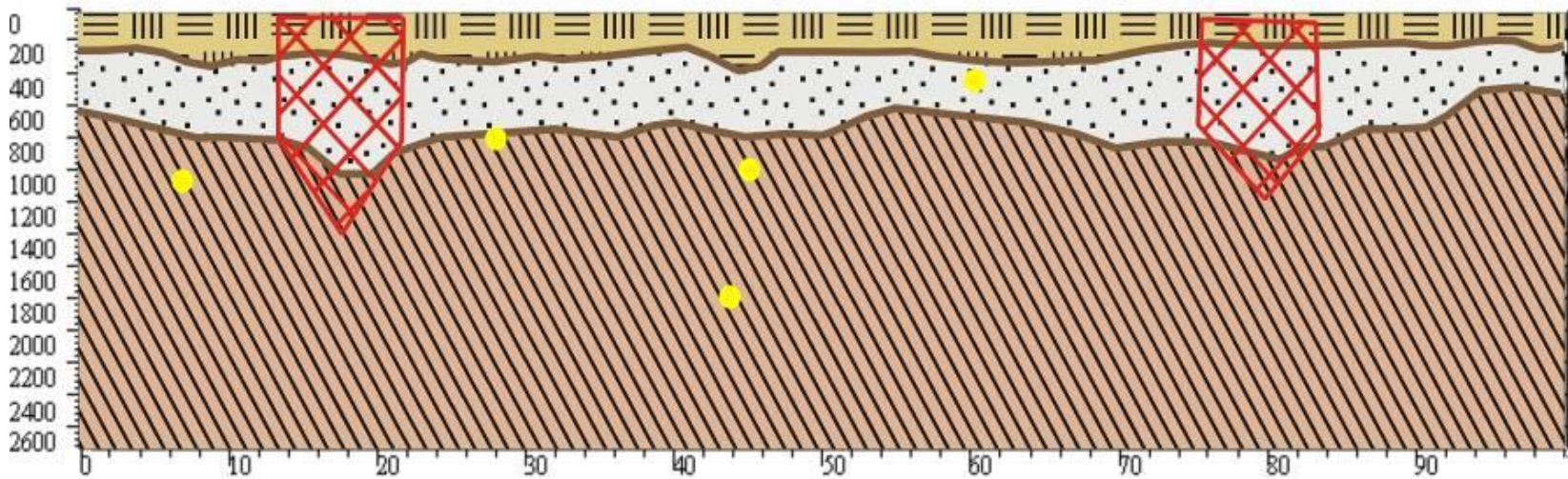
Cross section in pedestrian mode



Moscow, 2008 - 20013



Radarogram with the results of the primary interpretation



Geological and geophysical section

Thank you for your attention!



□ Video



□ Information



□ Questions and answers



□ Photo



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2-ая ул. Энтузиастов, д.5, корп.39,

Москва, 111024, РФ

8 (800) 5-506-506