ARCADIS Design & Consultancy for natural and built assets

ROMANIAN SECTION OF THE BRUA NATURAL GAS TRANSMISSION CORRIDOR PROJECT

Appendices Document

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Incorporating

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Hyder

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Appendix 5.1 Environmental Agreement

IV. CONDITIONS TO BE MET:

1. During the accomplishment of the project:

The holder must designate a person responsible for environmental protection during the project and during the operation, to monitor the compliance with the measures and conditions of environmental approval and monitoring plan and inform the environmental authorities of any accidental pollution occurred.

The **WATER environmental factor:**

■ The holder has the obligation to observe the water management permits;
■ Works related to the crossing of water courses will not be executed in high water periods; throughout the execution of the works forecast data will be requested from the Romanian Waters National Administration on flows and levels in watercourses crossed;
■ During the execution of the works strict rules shall be followed and working time technologies to prevent accidents with loss of material in the river beds;
■ The duration of the execution of the watercourse crossings will be shorten as much as possible to reduce the duration of the manifestation of adverse effects on water;
■ Avoiding the risk to drive construction materials when works are executed in the close proximity to water courses;
■ the site organization shall not be located near water courses;
■ the site organization will be equipped with sewage, treatment and disposal of sewage waste systems from canteens and hygienic sanitary facilities and sewage systems, treatment and disposal of rainwater that washes site management platforms;
■ the wastewater resulting from washing vehicles and construction machinery will be collected and treated in oil separators and decanters before unloading;
■ Ditches and sewers will be maintained for taking rainwater from the platform of the site organization;
■ Observe the rules of sanitary protection of water sources of surface and groundwater;
■ The discharge of untreated waste water and sludge from the settling surface water or groundwater is prohibited;
■ Waste storage in any water courses is prohibited;
■ Washing machines and means of transport in surface water is prohibited;
■ Storing and parking machines in the bed of minor or major watercourses is prohibited;
■ Storage of wood in stream beds and flood valleys or in exposed places is prohibited;
■ During the execution of the works and after their completion, materials that prevent normal water course will be eliminated from the bed;
■ In the event of accidental pollution, floods or upon the appearance or other critical situations on watercourses immediate actions will be taken to eliminate the factors generating pollution and notify the water protection authorities and the affected groundwater and water users;

For AIR environmental factor:

■ The use the equipment and means of transport technically regulated so as not to generate pollutants, noise, vibration and spills of fuels and lubricants;
■ Inspecting regularly the equipment and means of transport in terms of level and concentrations of carbon monoxide in exhaust gas emissions and startup only after the remedy of any malfunctions;
■ Application of clean technologies to minimize emissions of dust and particles resulting from earthworks and manipulation of land within the limits imposed by STAS 12574/1987 on air quality conditions in protected areas;

For the SOIL environmental factor:

■ The materials will be accepted, handled and stored in accordance with specific rules for each type of material, safe for personnel and the environment;
■ Avoid high quality land employment for site organization and pipe warehouse;
■ The site management platforms will be concreted and will be provided with collection systems, sewage and rainwater;
■ The maintenance platform and machines washing will be made with sufficient slope to ensure the collection of waste water from machines washing in pools of oil decanters and separators of oil products;
■ Exert rigid control during the transport of concrete from cement by cement mixers to prevent

accidental discharge on the route;
■ The transport / handling of hazardous waste generated and will be used in such a manner as not to cause pollution of soil, surface waters and groundwater;
■ The transport of hazardous substances used in various operations, will be made only by authorized vehicles to transport hazardous substances as required by GD no. 1175/2007 approving the Norms of performing road transport activities of dangerous goods in Romania, the vehicles must be licensed and certified to transport hazardous substances and own an ADR certificate:
■ soil pollution is forbidden from fuel and oil storage operations, refueling equipment and means of transport, oil exchange in machines, or because of their malfunction;
■ accidental leaks of fuel or oil will be quickly collected and removed with absorbent materials to be collected in closed and labeled containers - temporarily stored in specially designed space until their delivery to an authorized operator for the collection / disposal of waste oil;
■ In case of accidental pollution, areas where the soil, subsoil and terrestrial ecosystems have been affected, the county agency for environmental protection will be notified to which the proposal to remedy it will be sent; the investigation and assessment of soil and subsoil pollution will be in accordance with Government Decision no. 1408/2007, and remediation and environmental construction, according to GD no. 1403/2007;
For noise reduction:
■ pipes transport on public roads through the village will be done at low speed to reduce the effect of vibration, and the wheels are cleaned beforehand to avoid dirt roads;
■ Use of equipment and vehicles in an appropriate manner in terms of minimizing noise emissions, including selection of quieter equipment, regular maintenance and the use of silencers;
■ Requiring contractors to observe regular working hours during the day;
■ minimize their potential operations generating noise at times that do not coincide with the rest period of the population;
■ measures will be taken to prevent noise and comply with the standard norms for vibration and noise in accordance with STAS no. 10009/1988 and STAS no. 12025/2/1981;

For waste management:
■ Waste management will be done in strict compliance with Law No 211/2011 on waste regime;
■ When the works are commenced, the contractor will have concluded contracts with valorization / recyclers of waste, sanitation operators or operators of landfills approved for eliminating them;
For the protection of cultural patrimony
Where, during construction, there are signs of possible vestiges, the perimeter will be isolated and the entire activity in the immediate vicinity thereof shall cease. The authorities and competent institutions will be informed in order to achieve the archaeological discharge and will subsequently establish perimeters where the BRUA project may continue. In the subsequent stages the archaeological discharge will be carried out where such items of archaeological heritage were discovered.
For the protection of biodiversity of the natural protected areas:
■ Given the presence of Natura 2000 species common to the whole national territory (ex. Bombina bombina, B. variegata, Callimorpha quadripunctaria, etc.) the management prescriptions mentioned in this regulatory document will be implemented on the entire BRUA pipeline route.
■ For all the impacted fauna and flora species located in the area of the project's implementation all the management prescriptions will be implemented in order to reduce to the maximum the potential impact, throughout the year, at the level of those sectors where they were highlighted. The detailed description of the management prescriptions are presented in the Descriptive charts within the Annexes to the documentation underlying the issue of this decision.
■The beneficiary and the constructors implementing the project in the field have to have a copy of this regulatory document, of the custodians of the natural protected areas as well as of all the documents underlying the issue of this regulatory document in view of the implementation of all the management prescriptions provided in it.
■ according to its scope this project requires the monitoring of the environment, both in the execution stage, so as for erosion phenomena or accidental pollution with fuels and oils not to occur following the non-observance of the provided measures, and most of all during the operation stage in order to identify the possible negative effects upon the environment, paying attention to the riparian habitats. In this respect, from the point of view of biodiversity management a quantity and quality inventory of some key groups will be prepared, following the enshrined monitoring schemes for comparing the

effects of the investment with the preparation of the inventories for the key species, to be compared with the existent data about that area in the pre and post project implementation period (annex no 1 to this environment agreement). The possible negative effects which may be highlighted following the implementation of the provisions of the monitoring plan will be remedied by proposing impact mitigation measures and their evaluation until the compliance with the specific ecological requirements.

■ the biodiversity monitoring plan will be implemented during the entire duration of the construction and during the post implementation period for 36 months. Taking into account that as the BRUA project implies construction stages from the incipient months, part of the monitoring stages will overlap with the construction period to be developed at neighboring sectors.

■ prior to the commencement of the pipeline construction implementation, the team of specialists in subcontracted biodiversity will set the form of the notices protocols necessary for monitoring biodiversity and the form of the sample reporting forms. After the setting of the notices protocols and of the reporting sample forms they will be sent to the competent authority for environment protection and to the custodians. At the same time the number of the notices protocols for biodiversity monitoring (taking into account the ecology of the species) prepared in the field, the methods used for the observation in the field, the annual reporting models undertaken and the reporting stages will be also sent.

The number of the reports to the competent authority for environmental protection, beneficiary and third entities (custodians of the natural protected areas crossed by the pipeline or in its vicinity) will be at least one per year and will include all the information gathered from the biodiversity monitoring activity and from the efficiency related to the implementation of the impact mitigation measures.

At the competent authority for environment protection a report will be submitted per year to contemplate the results of the monitoring performed during the construction and operation period.

■ Before the commencement of the works the administrators and the custodians of the natural protected areas where the project is implemented will be notified and the conditions imposed by them will be complied with.

■ In case of the accidental occurrence of a harm affecting the species and habitats for which the natural protected area was designated the custodian/administrator of the natural protected area will be notified immediately as well as the Agency for Environmental Protection and GNM – Commissioner in that county in view of setting the mitigation measures to be applied by the person or entity which caused the harm.

■ the Beneficiary of the project must make sure that the provisions of this document are notified to the executors of the construction works.

■ the Beneficiary of the project must notify the constructor (either by the tender book or otherwise) the project implementation conditions and to make available to them the entire documentation underlying this regulatory document.

■ the responsibility related to the implementation of the measures and conditions from the documentation underlying the issue of this document is both with the beneficiary and with the constructors of the project. The beneficiary of the project is responsible for ensuring the implementation of the measures and conditions herein by the **specialists in the biodiversity field**.

a) technical conditions required by specific legal provisions (Romanian or Community):

■ Compliance with the legislation on environmental protection;

■ The execution of the works is in compliance with the submitted technical documentation, as well as specific technical norms and regulations related to the project;

■ It is essential to observe the route described in the documentation and the works presented in the report on environmental impact assessment and appropriate assessment study.

Specific conditions for **deforestation**:

■ Deforestation will be made only after obtaining necessary approvals from the Forest Directorate which manages the forest and forest owners;

■ Deforestations will be limited to areas strictly necessary for carrying out the works;

■ The directions for tree falling will be chosen so as not to affect the trees in the vicinity;

■ The falling of the trees will be made orderly so as to avoid their falling over trees outside the perimeter that is deforested;

■ Only the trees marked by representatives of forestry will be cut;

■ Fallen trees will be temporarily stored on the surface of the working stripe, then they will be loaded into vehicles and transported to the site;

■ The vehicles carrying the cleared wood will handle it carefully so as not to affect the trees in the area bordering the area to be deforested;
■ It is prohibited to store scrap wood in riverbeds or in places exposed to floods.

b) technical conditions arising from the report on the environmental impact that integrates the conclusions of the appropriate evaluation:
Given that areas of land occupied by BRUA at the level of Natura 2000 sites remain restricted, totaling 48.49 hectares, and of these only 55 square meters will be permanently occupied by a station of valves at ROSCI0236, there will be no significant effect on the surface of the sites following the implementation of the projects.
At the crossing of stands (including the level of Natura 2000 sites) a working stripe of 14 m will be executed, a 12 m strip will be subject to complex measures of ecological restoration and restoration in natural circuits comparable to the forestry , thus representing 86% of the total affected perimeters.

The ecological restoration solution will involve the following**:**
• on a width of 2m (1 + 1) (situated at the side of the working stripe) the forest edges will be remade by planting saplings from the forest species characteristic to the vegetation floor and composition of the forest;
• on a width of 4m (2 + 2, 3 + 1) (situated further to the pipeline) shrub and woody medium and large species will be planted (root system to develop a footprint area of maximum 4m (and thus not be able to affect BRUA pipeline, species of hazel will be planted (Corylus avellana), which lends itself well to curdling skirts and provides a trophic source (and resource forest valuable secondary). In addition to hazel one can plant species with high ecological value (depending on the resort), such as hornbeam (Carpinus betulus), alder (Alnus sp.), hawthorn (Crataegus monogyna), downy oak (Quercus pubescens), etc;
• on a width of 6m (3 + 3, 4 + 2, 5 + 1) (situated further to the pipeline) shrub species will be planted that develop root systems, modest, without affecting BRUA pipeline. We propose in this regard the use of damask rose (Rosa canina, Rosa sp.), Blackthorn (Prunus spinosa). It is expected that blackberry and raspberry species will enter free after installation of natural succession of vegetation, contributing to the unification skirts and restricting the opening of fragmentation;
• a strip of about 2 m which will follow the BRUA route will remain free to allow monitoring during operation;

Fragmentation of habitats of community interest:
Phenomena of fragmentation will occur only in the construction phase, the phenomenon remains limited in scope and temporary space, the forward speed of the works being high (average 1.1 km / month).
The duration or persistence of fragmentation:
One cannot speak about a fragmentation of the habitats of community interest and in the situation of the persistence of aggressive activities that might affect some species of fauna remains extremely low.
In each sector of the works a presence of more than 12 months disturbance was granted (Construction period, which includes ecological restoration measures).
Duration or persistence of the disturbance of the species of Community interest.
Given the absence from the implementation area of the project of the significant population of the criterion species underlying the designation of the site or the pace of work and persistence of post-implementation impact associated with it, it cannot be assessed the presence of a lasting disturbance to be felt as criterion elements within the site.
The works will take place outside the site (if ROSCI0296, ROSCI0087, ROSCI0109, ROSPA0045) or will affect a small percentage, well below 1% of their total surface.
In this regard:
■ it is prohibited to abandon waste, residue, material of any kind in the forest or in protected natural areas;
■ strictly control waste in accordance with the waste management plan;
■ it is prohibited to create new access roads, no shortcuts will be arranged, use the same routes and avoid unnecessary maneuvers;

■ forbidding the execution in natural protected areas or forest of maintenance or repair works to vehicles or equipment, including those who can no longer move;
■ prohibits the use of machinery or equipment leaking oil products.
■ given the absence of a direct or indirect impact on the criterion elements that led to the designation of the site gives a neutral level of cumulative impact, regardless of the number and intensity of other categories of impact occurred at the site.
conditions required to be met during the site organization:
■ the location of the site organization and pipe warehouses, according to the submitted documentation;
■ the site organization should not be located near water courses;
■ the site organization should not be located within the perimeters of protected natural areas of community interest;
■ the space occupied by the site organization will be limited to what is necessary and will be fenced to ensure security in the area;
■ the organization and equipping of the the PSI point to intervene in the event of fire;
■ the platforms of the site organization will be concreted and maintained clean;
■ ensure the necessary utilities for the smooth conduct of the works (water supply source, special place for dining, sanitary facilities, waste disposal containers);
■ ensure auto access and appropriate horizontal and vertical signalling;
■ use of modular containers for offices, laboratory, staff accommodation, which will be relocated to another location of another site organization;
■ shield to reduce the effects of noise outside the site boundaries;
■ use of machinery and equipment in perfect condition;
■ for site organization is recommended to design a sewage system, water treatment and evacuation as waste from the canteen, hygienic-sanitary spaces and rainwater that wash the platform of the organization and water from machines washing;
■ the washing and maintenance ramp for the vehicles will be fitted with drainage channel from washing and decanter - separator for separating petroleum products;
■ the site organization platform will be provided with ditches or Pere gutters allowing rainwater collection, or drain holes;
■ selective waste collection in containers, temporary storage in dedicated facilities, safe until their transport to landfills or from authorized operators for final recovery;
■ fuel storage tanks equipped with locking devices located on platform (capacity 110%) in safe areas designated, located away from watercourses, geological protection areas and drains;
■ oils (engine, hydraulic, etc.) for the operation of transport vehicles and machinery should not be stored in the working front, the oil exchange, maintenance or repairs being accomplished at the site or in the premises of specialized units of the localities in the close proximity.

Environment monitoring plan: <u>During execution</u>:

In order to monitor the efficiency of the implemented measures and to establish corrective measures in case specific rules on environmental protection are not complied with, the holder:
■ shall establish a program of measurements to determine noise levels: inside the site organization, deposits pipe the gas pipeline route; when exceeding the allowable limits set by the rules of environmental or occupational health, organizational measures will be taken and / or appropriate technical noise mitigation;
■ will monitor the operation of facilities serving the site organization; the measurements will be made by RENAR accredited laboratories;
■ will check the operation of depollution installations and measures on cleaning them regularly;
■ will regularly check the equipment park for identifying failures;
■ check the tightness of fuel storage tanks or of hazardous substances;
■ check the waste generated on site as site organization and in the work fronts and report periodically to the territorial authority for environment protection organizations located in the counties where the site is located;
■ Establish an intervention program and take action, where quality indicators specific to environment factors (air, water, soil) do not fall within the limits of the applicable law;

■ Establish a program for prevention and control of accidental pollution: measures need to be taken, intervention teams, facilities and equipment in case of accident;
■ Organize a system where people can inform the holder of the discontent that he has regarding pollution, traffic through the creation of a hotline in site management and appointing a person from the employees to collect all opinions expressed in incoming calls and to send a response after the analysis of the situation. This phone number will be made public through the local media, by displaying it at the premises of town halls where the pipeline crosses.

During the operation:
a) the conditions required to be met according to specific legal provisions:
■ Comply with the specific legislation on natural gas transmission through pipelines.
b) conditions arising from the report on the environmental impact or the specific requirements of EU law:
For AIR environmental factor:
Avoid carrying out maintenance work on dust emissions during periods of strong wind;
For WATER environmental factor:
■ Maintaining gutters for taking rainwater from the platform of technological installations and compressor stations;
■ treatment stations inside the compressor stations will ensure a high degree of purification, so the treated water can be discharged into an emissary;
■ In hydrogeological protected areas of groundwater rainwater collected from the stations will not be evacuated;
■ sludge collected from trenches will be transported to authorized waste deposits;
For reduction of noise and vibrations:
■Take measures to limit noise by placing insulation noise level at halls and bonnet equipment of compression stations, so the noise level of facilities designed to keep within limits, without exceeding 65 dBA limit enclosure.
■ Take measures to prevent noise and framing the standard norms for vibration and noise in accordance with STAS no. 10009/1988 and STAS no. 12025/2/1981.

For waste management
■ During the operation of the pipeline no waste will be produced.
-If it is necessary to replace a pipe section, reassess the environmental conditions and develop a new impact assessment, suggesting appropriate measures depending on the size of the works, equipment used, etc.
-During pipeline operation no waste will be produced.
-The constructor and the pipeline operator will implement biodiversity monitoring plan for implementation period.
-the constructor will implement a plan on air quality monitoring, soil and noise level.
- the monitoring works of the impact of construction activities on surface waters will have a permanent character during the works.
-upon the reception of the materials, the compliance with quality certificates accompanying correspondence shall be verified.
- Substandard quality materials will not be used to execute the works.
-Any replacement or change of material can be made only with the written consent of the general designer and the beneficiary.
-Welds will be fully controlled by non-destructive methods to ensure tightness.
-Plugging pipeline will be made only after: checking and isolating all welds, performed in pits position, potential mounting sockets (where applicable) coating achievement, achievement with drainage vents (where applicable).

Monitoring the environment components:

Environment factor	**Protocol**	**Frequency**
Pre-construction stage		

Soil, water, biodiversity	Comparative analysis of the situation at the locations based on the sample charts prepared for each 5 km section	Before the commencement of the works
Construction stage		
Water	Analysis: pH, dissolved oxygen, oil products and temperature Comparison with NTPA	Quarterly
Air	Noise levels Comparison with	Quarterly
Biodiversity	Recording incidents caused by BRUA interaction with the fauna species; Documenting the dynamics of the translocated elements in line with the management requirements, Comparison with the local biodiversity indices	According to the seasonal stages
Post construction stage		
Water	The degree of restoration of the riparian area affected during the crossing, Documentation of the possible erosive effects, shore slides, etc.	Quarterly
Soil	The level of the morphological restoration of the working stripe (restoration to the initial condition);	Quarterly
Biodiversity	The degree of restoration of the vegetal carpet (coverage coefficient) The degree to which the land was restored to the natural/productive circuit, Dynamics of the alien, ruderal, invasive, synanthrope species, etc. Documenting of the persistent negative effects (erosion, compaction, etc)	Quarterly
Operating stage		
Water	Compliance to NTPA001/NTPA002 Documenting the possible erosive effects, shore slides, etc.	Annually
Air	Noise level Monitoring the level of emissions – combustion gas	Annually

b) compliance required by specific legislation in the field of air quality, water management, waste management, noise, nature protection:

■ concentrations of pollutants discharged into the atmosphere will not exceed the ambient air limit values laid down by Law no. 104/2011;

■ Quality indicators for storm water discharged into the environment shall not exceed the values prescribed by GD 352/2005, 001/2005 NTPA document;
■ Managing all categories of waste will be carried out in strict compliance with Law no. 211/2011 on waste regime;
■ After analyzing the results of the monitoring additional measures will be proposed for the protection of the environment (if applicable);
3) During the closure, decommissioning, reclamation and post-closure
conditions required to be satisfied at closing / dismantling / demolition
■ Restore the initial environmental conditions after completion of closing the perimeter for the site organization;

b) conditions for restoration of original condition /rehabilitation for future use of the land

Dispose of all materials, equipment, waste from the site and land leveling in the site organization; environmental monitoring plan, indicating the environmental components to be monitored, periodicity, parameters and monitoring the chosen location for each factor:
■ Observe the applicable provisions of the following legal acts:
- GEO no. 195/2005 on environmental protection, approved by Law no. 265/2006, as amended and supplemented;
- Law no. 104/2011 on ambient air quality;
- STAS 12574/1987 Air in protected areas;
- STAS 10009/1988 - urban acoustics. Allowable noise limits;
- O.M no. 462/1993 for the approval of the technical and methodological norms on the protection on determining atmospheric emissions of air pollutants produced by stationary sources;
- Law no. 458/2002 *** Republished regarding drinkable water quality;
- Water Law no. 107/1996 as subsequently amended and supplemented;
- GD no. 188/2002 for approving the rules on conditions for discharge of wastewater into the aquatic environment, with subsequent amendments and additions;
- Order no. 756/1997 approving the regulation on the assessment of environmental pollution.
- Order no. 119/2014 approving the Norms of hygiene and public health on the population's living environment;
- Law no. 307/2006 on fire safety, as supplemented and amended;
- O.M. no. 2387/2011 amending O.M. no. 1964/2007 regarding the creation of the protected area of sites of Community importance as part of the European ecological network Natura 2000 in Romania;
- GD no. 971/2011 amending and supplementing H. G. no. 1284/2007 declaring Special Protection Areas as part of the European ecological network Natura 2000 Romania
- GEO no. 57/2007 on the regime of protected natural areas, conservation of natural habitats, flora and fauna, approved with amendments by Law no. 49/2011;
- GEO no. 68/2007 on environmental liability with regard to the prevention and remedying of environmental damage, approved by Law 19/2008, as amended by O.U.G. no. 15/2009;
- Law no. 211/2011 on waste regime;
- GD no. 856/2002 for approving the list of waste management and waste, including hazardous waste, as amended and supplemented;
- GD no. 235/2007 on the management of waste oils;
- GD no. 170/2004 on the management of used tires;
- GD no. 1132/2008 on batteries and accumulators and waste batteries and accumulators, as amended and supplemented;
- Law no. 249/2015 on the management of packaging and packaging waste, as amended and supplemented;
- Order no. 794/2012 on the procedure for reporting data on packaging and waste packaging;
- GEO no. 5/2015 on electrical and electronic equipment waste;
- GD no. 124/2003 regarding the prevention, reduction and control of environmental pollution by asbestos, as amended by GD no.734/2006.

Appendix 9.1 River Crossings

Nr.crt	Cod	River name	Flow rate Q1% (mc/s)	Location (km)	Open-cut Techniques Total length (m)	Open-cut Techniques Ballasting pipe (m)	HDD (m)	Execution Time Total (days)	Execution Time Work in river bed (days)
LOT 1					**2004.9**	**851.6**	**891**	**348**	**140**
1	TA1	Neajlov river	340	4+859	62	37		8	5
2	TA2	Dambovnic river	350	11 + 265	59	32		8	5
3	TA3	Glavacioc Creek	70	30+ 142	58.2	32		8	5
4	TA4	Vii valley	46	36 + 794	45	21		6	3
5	TA5	Virosi valley	10	38 + 859	55.5	32		8	5
6	TA6	Clanita Creek	21	40 + 861	47	21		6	3
7	TA7	Dobrei Creek	22	44 + 758	29	26		4	4

8	TA8	Teleorman river	290	50 + 859	39.4	17		5	2
9	TA9	Bucovel Creek	31	54 + 567	33.9	10		5	2
10	TA10	Cainelui river Stauleni lake	48	58 + 832	176	76 Coffer dam		24	14
11	TA11	Burdea Creek	47,5	65 + 302	56.3	21		8	3
12	TA12	Tecuci Creek	23	69 + 639	46.7	21		6	3
13	TA13	Cotmeana river+Lerului valley	520	75 + 804			416	32	0
14	TA14	Vedea river		81 +000	62	32		8	5
15	TA15	Osica Creek		84+ 008	56.1	10		8	2
16	TA16	Negrisoara Creek		95+653	51.2	21		7	3
17	TA17	Plapcea Mica Creek		98+738	52.4	21		7	3

18	TA18	Plapcea Creek		102+809	48	24		6	4
19	TA19	Pialita Creek		105+132	38.7	10		5	2
20	TA20	Gota Creek		107+647	41	10		5	2
21	TA21	Stejarul Valley (Darjov Creek)		110+150	35	10		5	2
22	TA22	Teslui river		114+533	48	21.2		6	3
23	TA23	Olt river		119+741			475	37	0
24	TA24	Oporelu chanel		120+101	47	27		6	4
25	TA25	Dalga Creek		121 +782	45	21		6	3
26	TA26	Bazavanul Creek		124+193	33	10		5	2
27	TA27	Dalga Creek		129+842	44	16		6	3
28	TA28	Creek Putreda		134+109	30	10		5	2
29	TA29	Creek Pesceana		136+282	34	10		5	2

30	TA30	Creek Pesceana		137+470	52	21		7	3
31	TA31	CreekPesceana		138+195	49	21		7	3
32	TA32	Creek Verdea		139+388	39	16.2		6	3
33	TA33	Creek Pesceana		142 461	38	16		6	3
34	TA34	Creek Gusoianca		144+ 809	35	10		6	2
35	TA35	Creek Gusoianca		145+787	31	10.2		5	2
36	TA36	Creek Gusoianca		146 +142	45	16		7	3
37	TA37	Creek Gusoianca		149+371	36	10		5	2
38	TA38	Creek Gusoianca		154+968	36	10		5	2
39	TA39	R. Cerna		162+763	61	32 Coffer dam		8	5

40	TA40	Creek Glamana		165+500	48	21		6	3
41	TA41	Creek Omorocea		167 + 32	32	10		5	2
42	TA42	CreekSasa		171 +718	44.5	16		6	3
43	TA43	River Oltet		175+287	85	43 Coffer dam		14	8
LOT 2					**1259.4**	**509**	**424**	**237**	**117**
1	TA 44	Creek Pesteana		184+699	44	21		7	3
2	TA 45	Creek Plosca		186+605	45	18		7	3
3	TA 46	Creek Amarazuia		192+349	53	21		7	3
4	TA 47	River[AGL270] Amaradia		196+663	52.4	27 Coffer dam		14	10
5	TA 48	Creek Totea		198+836	47.5	10		7	2
6	TA 49	Creek Vladimir		206+897	38	10		5	2
7	TA 50			225+32	89	43		16	10

		River[AGL271] Gilort				Coffer dam			
8	TA 51	River [AGL272]Zlast		-	27	6		4	1
9	TA 52	River[AGL273] Budieni		240+510	57	22		10	7
10	TA 53	River[AGL274] Amaradia		244+240	74	43		14	10
11	TA 54	River[AGL275] Amaradia		246+639	69	32		12	8
12	TA 55	River[AGL276] Amaradia		248+269	62	32		12	8
13	TA 56	River[AGL277] Inoasa		249+853	47	21		7	5
14	TA 57	River[AGL278] Inoasa		250+452	33	7		5	3
15	TA 58	Creek lazul Topilelor		258+637	34	8		5	3

16	TA 59	River[AGL279] Jiu		261+129			424	33	0
17	TA 60	Creek Cartiu		269+457	43	16		5	3
18	TA 61	Creek Baleia		292+786	49	21		5	3
19	TA 62	River[AGL280] Jiul de Vest		293+766	76	43		21	14
20	TA 63	River[AGL281] Crevedia		300+705	40.2	10		5	3
21	TA 64	Creek Crevedia		301+646	45.1	8		5	2
22	TA 65	River[AGL282] Crevedia		304+403	66.7	10		12	2
23	TA 66	Creek Valley Ráchitei		307+627	34	10		4	2
24	TA 67	Creek Crivadia		311+557	37	16		4	3
25	TA 68	Creek Crivadia		311+845	51	27		6	4
26	TA 69	Creek Muncel		313+806				0	0

27	TA 70	Creek Barusor		314+892	45.5	27		5	4
28	TA 71	Creek Valley Verde		319+676				5	2
LOT 3					**1784.5**	**911.7**	**3057**	**615**	**211**
1	TA 72	River Bárbat		321+960	98	76		16	14
2	TA 73	Creek Rusor		327+51	56.8	32		7	4
3	TA 74	River Serel		327+182	61	32		14	4
4	TA 75	Creek River Alb		330+123	36	16		6	3
5	TA 76	River Paros		331+83	60.8	32		10	6
6	TA 77	River Salasul		332+10	42	16		7	3
7	TA 78	River Sibisel		337+120	53	28		9	5
8	TA 79	River Mare		338+983			457	35	0
9	TA 80	Channel ul Creek de Câmp-irigat	4,41	348+813	31.7	17		8	8

10	TA 81	Channel Odovajnita-necadastrat		350+7	31.8	9		10	8
11	TA 82	River Râusor	14,09	353+923	25	11.9		4	2
12	TA 83	River Breazova (aval)	154	354+292	39.5	20		6	4
13	TA 84	River Breazova (amonte)	154	354+920	45.3	30		7	5
14	TA 85	River Zlotina	51,4	356+451	49.2	26.6		7	4
15	TA 86	River Breazova	96,70	359+106	43.1	22.9		7	4
16	TA 87	Creek Valley Zeicani	5,82	359+534	41.8	24		7	4
17	TA 88	Creek Talher-aval	28,47	361+455	23.6	7		4	1
18	TA 89	Creek Talher	28,47	361+551	45	21		7	3

19	TA 90	Creek Talher	28,47	362+046	30.1	23		5	4
20	TA 91	Creek Talher	28,47	362+494	28.2	7		4	1
21	TA 92	Creek Talher	28,47	362+670	37.1	10		5	1
22	TA 93	River Bistra	149	364+708	34.2	15		5	2
23	TA 94	Valley Bucovita	30,90	369+824	26.5	11		4	1
24	TA 95	River Marga	122	376+828	44.8	17		7	4
25	TA 96	River Hodincior	29,70	380+506	73.3	29		12	6
26	TA 97	Creek Slatina	13,90	382+550	25.1	8		4	1
27	TA 98	Valley Mare	19,90	384+249	34.4	14		5	2
28	TA 99	Bistra Màrului	308	388+445	82.7	48		14	8
29	TA 100	Valley Scoartei	24,60	393+502	34.1	12		5	2
30	TA 101	Creek Eruga	10,10	398+259	90.8	59		18	14

31	TA 102	Creek Eruga-aval	19,60	402+330	78.1	56.6		16	14
32	TA 103	Creek Eruga	19,60	402+605	31.1	11		8	5
33	TA 103bis	Creek Eruga-aval	19,60	402+667	36.1	28		9	8
34	TA104	River Satului Axin(River)	109	404+015	34.7	16		8	5
35	TA105	River Timis	716	406+000			866.4	70	0
36	TA106	Creek Macicas	51,80	411+779	36,6	17,5		9	4
37	TA107	Creek Vana Secàneascà	48,90	416+608	29.7	8		7	2
38	TA108	Creek Vana Mare	28,30	420+75	37.3	17		9	4
39	TA109	River Spaia	47,70	429+000			322.4	26	0

40	TA110	River Stiuca	36,30	432+359	43.8	22		7	6
41	TA111	River Timis	1248	437+872			384	32	0
42	TA112	River Binis	96,80	452+059	39.1	16.7		21	8
43	TA113	River Glavita	112	465+261			325.8	30	0
44	TA114	River Bega	311	459+286			375	32	0
45	TA115	Creek Minisul Bâtrân (Timisul Mort)	13,80	460+168	35.8	15		19	8
46	TA116	Channel Chizdia	65,10	460+683			325	26	0
47	TA117	Creek Glogovátu	7,71	466+388	40.7	25		7	4
48	TA118	River Mociur	23,60	469+450	45.3	26		8	4
49	TA119	Valley Isvarsita (debleu DD16)	10,90	473+483	27.9	11		5	2

50	TA120	River Lipari (Valley satului)	3,23	474+731	41	17		7	3

Appendix 9.2 Channels

Irrigation channel

Nr. Crt.	Cod	Irrigation channel name	Location (km)	Open cut Techniques		HD HDD (m)	Status
				Total length (m)	Ballasting pipe (m)		
LOT 1				2172.9	656	198	
1	THC	Channel	km 12+185	15	15		no water
2	THC 1	Ripple valley	km 15+753	35.3	10		no water
3	THC 2	Valley de Margine	km 24+496	30.9	15		no water
4	THC 3	Valley Strâmbă Tributary V. Porasca	km 31+897	58.1	21		no water
5	THC 4	Tributary V.Pietrișului și Valley Petrisului	km 35+527	53.7	37		with water
6	THC 5	Valley Tributary Stâng R. Teleorman	km 47+685	41	21		no water
7	THC 6	Valley Tributary Stâng R. Teleorman	km 49+518	37.7	10		no water
8	THC 7	Channel 1	km 50+266			38	DJ 504 + CE no water –with protection pipeline
9	THC 8	Channel 2	km 50+406	36.1	15		CE- no water
10	THC 9	Valley Strâmbeni	km 56+97	49.1	10		valley - no water
11	THC 10	Valley Plescara	km 60+557	36	10		valley - no water

12	THC 11	Valley Berzei	km 62+314	60.5	10		valley - no water
13	THC 12	Valley lui Taras	km 67+676	40.2	10		valley - no water
14	THC 13	Valley Cioroiului	km 68+315	62	10		seepage (h=3,1-3,3m)
15	THC 14	Valley Balancelul	km 69+309	56.7	21		seepage (h=3,9- 4,1m)
16	THC 15	Valley Copacului	km 73+730	36.6	10		valley - no water
17	THC 16	Channel 3	km 74+630	37.8	10		CE – no water
18	THC 17	Valley Lerului (416m)	km 75+687	0	0	0	Found in the table with water undercrossings at pos. TA13
19	THC 18	Valley Coada Alamu	km 79+596	40.4	10		valley -infiltratii de apa
20	THC 19	Channel	km 81+457	30	10		CE - no water
21	THC 20	Valley Șoimului	km 85+466	61	10		valley - no water
22	THC 21	Ripple Valley	km 87+075	29	10		no water
23	THC 22	Ripple Valley	km 87+893	39	10		no water
24	THC 23	Valley Viișoara	km 92+404	40	10		no water
25	THC 24	Valley Viișoara	km 92+490	38.4	8		no water
26	THC 25	Valley Viișoara	km 92+736	36.5	10		no water

27	THC 26	Channel	km 94+46	25	6		CE, no water
28	THC 27	Valley Berbecului	km 94+685	39	10		valley - no water
29	THC 28	Valley Gura Văii	km 95+733	35.3	10		valley - no water
30	THC 29	Channel	km 96+135	39	10		CE. no water
31	THC 30	Creek Adâncătura	km 98+445			48	CE. DN 65
32	THC 31	Channel	km 101+736	31	10		CE, no water
33	THC 32	Valley Mogoșești	km 103+813	67	21		valley - no water
34	THC 33	Valley Racovat	km 118+852	29	10		valley - with water
35	THC 34	Channel Dalga	km 121+68	31	10		Concrete irrigation channel
36	THC 35	Channel	km 124+450	41	10		CE no water
37	THC 36	Channel	km 127+157	32	10		CE - no water
38	THC 37	Channel	km 127+745	44	10		CE, no water
39	THC 38	Channel	km 131+22	47	10		CE, no water, De
40	THC 39	Channel	km 139+483	60.6	6		CE , no water, cond.GN(500
41	THC 40	Tributary R. Pesceana	km 140+423	48	16		valley - water
42	THC 41	Tributary R. Pesceana	km 141+173	26	10		valley - no water
43	THC 42	Tributary Creek Gușoianca	km 146+462	30	10		valley - water

44	THC 43	Tributary Creek Gușoianca	km 147+146	40	10		valley - no water
45	THC 44	Channel	km 149+647	37	10		CE-no water
46	THC 45	Creek Burdălești	km 150+319	43	17		valley-water infiltrations
47	THC 46	Tributary R. Cerna	km 160+724	49	21		valley - water
48	THC 47	Channel	km 161+428	28	10		CE- no water
49	THC 48	Creek Geamana (Tributary Creek Glamana)	km 165+843	33	10		valley - no water
50	THC 49	Channel	km 173+807	23	6		CE-no water
51	THC 50	Channel	km 174+599	27	10		CE -no water
52	THC 51	Channel	km 175+716	25	10		CE-no water
53	THC 52	Channel	km 175+969	22	6		CE-no water
54	THC 53	Channel	km 176+79	29	6		CE-no water
55	THC 54	Channel	km 176+411	30	10		CE-no water
56	THC 55	Channel	km 176+687	34	10		CE-no water
57	THC 56	Channel	km 177+667			112	CE-no water
58	THC 57	Channel	km 178+38	20	6		CE-no water
59	THC 58	Channel	km 178+148	30	10		CE-no water
60	THC 59	Channel	km 178+205	32	10		CE-no water
61	THC 60	Channel	km 178+821	27	6		CE-no water

62	THC 61	Channel	km 179+468	18	6		CE-no water
LOT 2				4658.68	965.2	534.8	
1	THC 62	Valley	km 181+127	42	16		valley - no water
2	THC 63	Valley	km 181+738	37	10		valley - no water
3	THC 64	Tributary Creek Olteț[AGL283]	km 182+499	25	6		CE-no water
4	THC 65	Creek Plosca	km 187+336	28	6		valley - no water
5	THC 66	Channel	km 192+636	41	10		CE-no water
6	THC 67	Channel	km 195+345	48.5	10		CE-no water
7	THC 68	Channel	km 196+785	24	6		ditch-no water
8	THC 69	Channel	km 196+884	24	6		ditch-no water
9	THC 70	Channel	km 197+589	31	10		ditch-no water
10	THC 71	Channel	km 200+47	50.7	20		ditch-no water
11	THC 72	Channel	km 200+123	40	16		irrigation channel – no water
12	THC 73	Channel (Torrent)	km 200+432	62	21		Torrent – no water
13	THC 74	Channel	km 201+919	44.1	32		Valley – no water
14	THC 75	Channel	km 203+107	32	8		Valley – no water
15	THC 76	Channel (irrigation ditch)	km 203+969	26	6		irrigation channel – no water

16	THC 77	Channel (irrigation ditch)	km 207+31	15.9	18		irrigation channel – no water
17	THC 78	Channel (irrigation ditch)	km 207+276	40	17		irrigation channel – no water
18	THC 79	Drain channel	km 210+44	19.4	0		CE-no water, concrete ditch
19	THC 80	Drain channel	km 210+788	100	0		CE-no water, concrete ditch
20	THC 81	Drain channel	km 210+955	100	0		CE-no water, concrete ditch
21	THC 82	Drain channel	km 211+77	100	0		CE-no water, concrete ditch
22	THC 83	Drain channel	km 211+274	100	0		CE-no water, concrete ditch
23	THC 84	Channel (no water Valley)	km 211+560	100	0		Valley – no water
24	THC 85	Drain channel	km 212+958	144	0		CE (THC85+THC86)
25	THC 86	Drain channel	km 213+3	0			CE (THC85+THC86)
26	THC 87	Drain channel	km 213+212	34	6		CE-no water
27	THC 88	Drain channel	km 213+270	80	0		CE-no water, concrete ditch
28	THC 89	Drain channel	km 213+364	80	0		CE-no water, concrete ditch
29	THC 90	Drain channel	km 213+627	22	6		CE-no water
30	THC 91	Channel	km 215+57	38	6		CE-no water

31	THC 92	Channel	km 215+579	0	0	28.8	CE-no water
32	THC 93	Channel	km 215+946	28	6		CE 7 -no water
33	THC 94	Drain channel	km 216+391	35	10		CE- no water
34	THC 95	Drain channel	km 216+786	84			CE- no water
35	THC 96	Drain channel	km 217+183	25.4	6		CE- no water
36	THC 97	Drain channel	km 217+665	30	6		CE- no water
37	THC 98	Drain channel	km 218+412	45.2	21		CE- no water
38	THC 99	Drain channel	km 219+482	131.8			CE-no water, concrete ditch
39	THC 100	Channel (Valley)	km 220+361	52	27		CE- no water
40	THC 101	Channel (Valley)	km 221+263	30	10		CE- no water (CE 3a)
41	THC 102	Drain channel	km 221+485	36	16		CE- no water, CE 3
42	THC 103	Channel	km 221+641	44	21		CE- no water
43	THC 104	Channel	km 223+48	49	8		CE- no water
44	THC 105	Channel	km 223+69	49	6		CE- no water
45	THC 106	Channel	km 224+12	0	0	52	CE- no water +DJ 661
46	THC 107	Channel	km 226+903	0	0	454 (HDD)	Torrent – no water
47	THC 108	Channel	km 228+584	85	21		CE- with water

48	THC 109	Channel	km 229+152	59	10		CE- no water
49	THC 110	Channel	km 229+535	29	6		CE- no water
50	THC 111	Channel	km 230+696	57	10		CE- no water
51	THC 112	Channel	km 231+333	25	6		CE- no water
52	THC 113	Channel	km 231+614	46	28		CE- no water
53	THC 114	Channel	km 233+777	52.5	21		CE- no water
54	THC 115	Channel	km 236+95	82	21		CE- no water
55	THC 116	Channel	km 241+221	33	8		CE- no water
56	THC 117	Channel	km 241+386	33	10		CE- no water, Lupoaia
57	THC 118	Channel	km 244+498	26	8		CE- no water
58	THC 119	Channel	km 245+234	25	6		CE- no water
59	THC 120	Channel	km 245+507	112			CE-no water, concrete ditch
60	THC 121	Channel	km 245+910	8.3			CE-no water, concrete ditch
61	THC 122	Channel	km 246+357	42	17		CE- no water
62	THC 123	Channel	km 249+557	6			CE- no water
63	THC 124	Channel	km 251+288	32	10		CE- no water
64	THC 125	Channel	km 251+755	44	21.2		CE- no water

65	THC 126	Channel	km 251+793	44	21		CE- no water
66	THC 127	Channel	km 251+901	40	10		CE- no water
67	THC 128	Channel	km 252+429	41.3	16		CE- no water
68	THC 129	Channel	km 252+849	58.6	27		CE- no water
69	THC 130	Channel	km 256+774	65	10		CE- no water
70	THC 131	Channel	km 256+864	30.4	10		CE- no water
71	THC 132	Channel	km 256+983	49.48			CE-no water, concrete ditch
72	THC 133	Channel	km 258+395	67	17		CE- no water
73	THC 134	Channel	km 258+440	40	6		CE- no water
74	THC 135	Channel	km 260+235	36	10		CE- no water
75	THC 136	Channel	km 263+124	38	10		CE- no water
76	THC 137	Forest Torrent	km 266+156	59	21		CE- no water
77	THC 138	Valley	km 272+701	48.7	16		valley – no water
78	THC 139	Torrent vf. Munte (Pas Vulcan)	km 284+967	46	0		torrent – no water
79	THC 140	Channel	km 294+144	71.7	0		One undercrossing for 4 channels
80	THC 141	Channel	km 294+157	0	0		THC140+THC141+THC142+THC143
81	THC 142	Channel	km 294+176	0	0		

82	THC 143	Channel	km 294+201	0	0		
83	THC 144	Channel	km 294+439	31	0		CE- no water
84	THC 145	Channel	km 294+536	33.7	0		Drain pipe (Dn600)-3 pieces
85	THC 146	Channel	km 295+715	34	10		CE- no water
86	THC 147	Channel	km 295+930	24	0		CE-no water, concrete ditch
87	THC 148	Channel	km 297+616	38	6		CE-no water, concrete ditch
88	THC 149	Channel	km 299+100	39.5	6		CE-no water, concrete ditch
89	THC 150	Channel	km 299+878	38	10		CE-no water, concrete ditch
90	THC 151	Channel	km 300+802	23	6		CE-no water, concrete ditch
91	THC 152	Channel	km 302+328	37	6		CE-no water, concrete ditch
92	THC 153	Channel	km 303+62	19.3	6		valley – no water
93	THC 154	Valley Loc. Dealu Babii	km 303+133	22	8		valley – no water
94	THC 155	Creek Mătiești	km 303+452	30	8		valley - with water
95	THC 156	Channel	km 304+374	66.7	26		Corbului spring + Crevedia river – with water
96	THC 157	Valley	km 309+588	34.4	10		valley – no water

97	THC 158	Valley	km 310+584	34.2	10		valley – no water
98	THC 159	Channel	km 311+63	27.3	5		CE – no water
99	THC 160	Valley	km 314+564	38.9	10		valley – no water
100	THC 161	Valley	km 315+102	39.3	10		valley – no water
101	THC 162	Valley	km 315+394	38	16		valley – no water
102	THC 163	Valley	km 315+542	29	10		valley – no water
103	THC 164	Valley	km 316+28	61	10		valley – no water
104	THC 165	Valley	km 316+367	36	10		valley – no water
105	THC 166	Valley	km 316+686	28.6	6		valley – no water
106	THC 167	Valley	km 317+448	35.6	6		valley – no water
107	THC 168	Valley	km 318+295	38.2	8		valley – no water
108	THC 169	Valley	km 318+545	41.6	6		valley – no water
109	THC 170	Valley	km 318+715	40.4	6		valley – no water
LOT 3				4289.2	1277.6	591.08	
1	THC 171	Channel	km 320+542	29	6		One undercrossing for 2 channels
2	THC 172	Channel	km 320+557	0	0		CE – no water, De + THC172 + THC 171
3	THC 173	Channel	km 321+497	24	6		CE – no water

4	THC 174	Channel	km 322+525	180	0		CE-no water, concrete ditch
5	THC 175	Channel	km 324+154	25	6		CE – no water
6	THC 176	Channel	km 324+261	121.4	0		CE-no water, concrete ditch
7	THC 177	Channel	km 324+817	180.4	0		CE-no water, concrete ditch
8	THC 178	Channel	km 328+471	33.3	0		CE-no water, concrete ditch
9	THC 179	Channel	km 329+67	44.7	21		CE – no water
10	THC 180	Channel	km 329+183	23.1	0		CE-no water, concrete ditch
11	THC 181	Channel	km 330+594	172	0		CE-no water, concrete ditch
12	THC 182	Channel	km 333+533	29	10		CE – no water
13	THC 183	Valley Maleiei	km 335+806	43.9	19		valley – no water
14	THC 184	Channel	km 336+701	23	0		CE-no water, concrete ditch
15	THC 185	Channel	km 337+477	30	5		CE – no water
16	THC 186	Channel	km 337+614	31	10		CE – no water
17	THC 187	Channel	km 338+264	29.1	5		CE – no water
19	THC 188	Channel	km 339+507	145.5	0		CE-no water, concrete ditch

20	THC 189	Channel	km 340+238	28	6		CE – no water
21	THC 190	Channel	km 341+941	118	0		CE-no water, concrete ditch
22	THC 191	Channel	km 342+726	224	0		CE – no water, (THC191 + THC192 + THC193), concrete ditch. One undercrossing
23	THC 192	Channel	km 342+758	0	0		
24	THC 193	Channel	km 342+836	0	0		
25	THC 194	Channel	km 344+130	19.4	7		CE – no water, continuous concrete cast ditch
26	THC 195	Channel	km 344+633	21.2	7		CE – no water, continuous concrete cast ditch
27	THC 196	Channel	km 345+112	19.4	6.5		CE – no water, continuous concrete cast ditch
28	THC 197	Channel	km 345+237	28.4	15		CE – no water, continuous concrete cast ditch
29	THC 198	Channel	km 345+489	18.5	6.5		CE – no water, continuous concrete cast ditch
30	THC 199	Channel C6	km 345+676	18.2	7		CE – no water, continuous concrete cast ditch

31	THC 200	Channel	km 346+000	21.6	6.5		CE – no water, continuous concrete cast ditch
32	THC 201	Channel C5	km 346+125	21.3	6		CE – no water, continuous concrete cast ditch
33	THC 202	Channel C4	km 346+540	20.9	6		CE – no water, continuous concrete cast ditch
34	THC 203	Channel CC3	km 346+754	17.7	6		CE – no water, continuous concrete cast ditch
35	THC 204	Channel	km 346+950	19.4	6		CE – no water, continuous concrete cast ditch
36	THC 205	Channel C3	km 347+000	19.7	6		CE – no water, continuous concrete cast ditch
37	THC 206	Channel CC2	km 347+212	19	6		CE – no water, continuous concrete cast ditch
38	THC 207	Channel C2	km 347+416	19.3	6		CE – no water, continuous concrete cast ditch
39	THC 208	Channel CC1	km 347+462	20.6	6		CE – no water, continuous concrete cast ditch

40	THC 209	Channel C1	km 347+810	19.4	6		CE – no water, continuous concrete cast ditch
41	THC 210	Channel CC4	km 348+075	14	6		CE – no water, continuous concrete cast ditch
42	THC 211	Channel CC35	km 348+511	22.8	9.2		CE – no water, continuous concrete cast ditch
43	THC 212	Channel	km 348+980	13.9	6.9		CE – no water, continuous concrete cast ditch
44	THC 213	Channel	km 351+023	24.8	10.7		CE – no water, continuous concrete cast ditch
45	THC 215	Channel	km 352+934	20.7	7		CE – no water, continuous concrete cast ditch
46	THC 216	Channel CP4	km 355+088	0	0	55.68	CE – no water + railway CF215 **
47	THC 217	Channel Ce5	km 355+381	19.3	7		CE – no water, continuous concrete cast ditch
48	THC 218	Channel Ce4	km 355+890	14.8	7		CE – no water, continuous concrete cast ditch

49	THC 219	Channel Ce3	km 356+028	22.5	9		CE – no water, continuous concrete cast ditch
50	THC 220	Channel	km 356+765	35	7.5		CE – no water, continuous concrete cast ditch
51	THC 221	Channel Ce2	km 356+927	21.6	7		CE – no water, continuous concrete cast ditch
52	THC 222	Valley	km 357+356	22.3	10		CE – no water, continuous concrete cast ditch
53	THC 223	Valley	km 357+616	28.4	16		valley - no water, continuous concrete cast ditch
54	THC 224	Valley	km 359+856	27.9	11.9		No water ditches, continuous concrete cast ditch
55	THC 225	Creek	km 360+358	39.8	18		No water spring - continuous concrete cast ditch
56	THC 226	Valley	km 360+812	28.3	6		deep valley (>6m) – no water
57	THC 227	Valley	km 361+146	39	11		deep valley (>6m) – no water
58	THC 228	Valley	km 361+297	32.7	11		deep valley (>6m) – no water

59	THC 229	Valley	km 362+817	37	14.3		valley (>3m) – no water
60	THC 230	Valley	km 363+261	9.3	6		valley (>5m) -no water
61	THC 231	Valley	km 365+350	24.6	0		valley – no water, concrete ditch
62	THC 232	Valley	km 366+320	42.4	24		valley - no water, continuous concrete cast ditch
63	THC 233	Valley	km 367+973	37.5	17		valley - no water, continuous concrete cast ditch
64	THC 234	Valley	km 368+769	29.2	16		valley - no water, continuous concrete cast ditch
65	THC 235	Valley	km 370+754	31.4	10		deep valley (>5m)- no water, continuous concrete cast ditch
66	THC 236	Valley	km 373+916	39.7	19		deep valley (>5m)- no water, continuous concrete cast ditch
67	THC 237	Valley	km 374+452	52.9	38		valley - no water, continuous concrete cast ditch

68	THC 238	Valley	km 374+843	68.3	51.1		valley - no water, continuous concrete cast ditch
69	THC 239	Valley	km 375+250	25	13.2		valley - no water, continuous concrete cast ditch
70	THC 240	Valley	km 377+000	36.3	26.3		valley - no water, continuous concrete cast ditch
71	THC 241	Valley	km 384+607	36	15.5		valley - no water, continuous concrete cast ditch
72	THC 242	Valley	km 384+789	34	19		valley - no water, continuous concrete cast ditch
73	THC 243	Valley	km 385+160	19.7	6		valley - no water, continuous concrete cast ditch
74	THC 244	Valley	km 385+339	17.8	6		valley - no water, continuous concrete cast ditch
75	THC 245	Valley	km 388+200	25,6	12.3		valley - no water, continuous concrete cast ditch
76	THC 246	Valley	km 389+483	34.5	28.2		valley - no water, continuous concrete cast ditch

77	THC 247	Valley	km 390+845	31.7	11		valley - no water, continuous concrete cast ditch
78	THC 248	Valley	km 392+233	20.5	6.7		valley - no water, continuous concrete cast ditch
79	THC 249	Channel C 108/1	km 399+064	24.6	11.5		CE - no water, continuous concrete cast ditch
80	THC 250	Channel	km 401+265	26.5	10.2		CE - no water, continuous concrete cast ditch
81	THC 251	Channel	km 401+546	26.5	10.7		CE - no water, continuous concrete cast ditch
82	THC 252	CN101	km 401+803	0	0	35.4	CN-no water + CF215 (TCF12)- Caransebes - Bautari
83	THC 253	CE9	km 402+364	78.1	57.6		Eruga spring- with water, continuous concrete cast ditch
84	THC 254	Channel	km 404+930	24	8.2		CE - no water, continuous concrete cast ditch
85	THC 255	Channel	km 408+962	19.5	6.2		CE - no water, continuous concrete cast ditch

86	THC 256	Valley Channel Izat	km 409+639	18.3	13.8		valley - no water, continuous concrete cast ditch
87	THC 257	Valley	km 409+942	16.4	12		valley - no water, continuous concrete cast ditch
88	THC 258	Channel	km 410+182	25.4	12		CE - no water, continuous concrete cast ditch
89	THC 259	Channel	km 411+550	35.5	8		valley - no water, continuous concrete cast ditch
90	THC 260	Channel	km 413+601	18.1	8		CE - no water, continuous concrete cast ditch
91	THC 261	Valley Prisaca	km 413+954	15.3	6		valley - no water, continuous concrete cast ditch
92	THC 262	Channel	km 414+242	26.4	11		no water ditches, continuous concrete cast ditch
93	THC 263	Valley Siliștea	km 414+574	20.8	10		valley - no water, continuous concrete cast ditch
94	THC 264	Channel	km 418+278	35.4	9.3		CE - no water, continuous concrete cast ditch

95	THC 265	Valley	km 418+954	20	7		valley - no water, continuous concrete cast ditch
96	THC 266	Valley	km 419+290	28.8	8		valley - no water, continuous concrete cast ditch
97	THC 267	Valley	km 420+667	23.7	10		valley - no water, continuous concrete cast ditch
98	THC 268	VALLEY	km 420+990	30.5	10		valley - no water, continuous concrete cast ditch
99	THC 269	Valley	km 422+113	18.5	7		valley - no water, continuous concrete cast ditch
100	THC 270	tributary Valley Mare	km 422+605	29.7	16		valley - no water, continuous concrete cast ditch
101	THC 271	Channel	km 423+005	30.3	7		CE - no water, continuous concrete cast ditch
102	THC 272	Channel	km 423+620	18.2	7		CE - no water, continuous concrete cast ditch
103	THC 273	Channel	km 423+792	14.1	7		CE - no water, continuous concrete cast ditch

104	THC 274	Channel e	km 424+714	68.3	24		CE - no water, continuous concrete cast ditch
105	THC 275	Channel	km 425+167	27.6	11		CE - no water, continuous concrete cast ditch
106	THC 276	Channel	km 426+250	28.2	15		CE - no water, continuous concrete cast ditch
107	THC 277	Channel	km 426+850	18.4	11		CE - no water, continuous concrete cast ditch
108	THC 278	Channel	km 427+781	15.9	7		CE - no water, continuous concrete cast ditch
109	THC 279	Channel	km 428+591	23.8	9.5		CE - no water, continuous concrete cast ditch
110	THC 280	Channel	km 437+840				CE - no water, continuous concrete cast ditch
111	THC 281	Channel CS6	km 440+208				
112	THC 282	Channel CP1	km 440+313	25.8	11		CE - no water, continuous concrete cast ditch
113	THC 283	Channel CS1a	km 441+020	0	0	46	CE – no water +str.Tr.Vuia / Lugoj

114	THC 284	Channel	km 441+170	17.3	7		CE - no water, continuous concrete cast ditch
115	THC 285	Channel	km 442+750	39.9	24		CE - no water, continuous concrete cast ditch
116	THC 286	Channel Db5	km 444+729	22.7	9		CE - no water, continuous concrete cast ditch
117	THC 287	Channel Db1	km 445+121	19.9	7		CE - no water, continuous concrete cast ditch
118	THC 288	Channel Db2	km 445+280	19.9	7		CE - no water, continuous concrete cast ditch
119	THC 289	Valley	km 445+993	15.9	4		valley - no water, continuous concrete cast ditch
120	THC 290	Channel	km 446+527	23.8	9		Channel - no water, continuous concrete cast ditch
121	THC 291	Valley	km 446+947	25.1	8		valley - no water, continuous concrete cast ditch
122	THC 292	Channel CP5	km 448+220	20.9	6		CE - no water, continuous concrete cast ditch

123	THC 293	Channel CP4a	km 448+670	0	0		CE - no water, continuous concrete cast ditch+ DC 128
124	THC 294	Channel CP4	km 449+740	25.7	11		CE - no water, continuous concrete cast ditch
125	THC 295	Channel CP2	km 450+841	18.1	6		CE - fara apa , lestare bet. Continua
126	THC 296	Channel CP2	Km 451+026	13.4	6		CE - no water, continuous concrete cast ditch
127	THC 298	Channel CCc1+drum	km 454+716	32.6	17.8		CE - no water, continuous concrete cast ditch
128	THC 299	Channel Bb1	km 456+301	0	0		drawing cannot be found
129	THC 300	Channel Bb10	km 456+511	30.9	12		CE - no water, continuous concrete cast ditch
130	THC 301	Channel Bb1	km 456+964	21.6	8		CE - no water, continuous concrete cast ditch
131	THC 302	Channel M2	km 459+455				drawing cannot be found

132	THC 303	Channel CD2	km 461+725	55.3	9		CE - no water, continuous concrete cast ditch
133	THC 304	Channel	km 462+178	21.3	7.7		CE - no water, continuous concrete cast ditch
134	THC 305	Channel CD1/1	km 462+296	27.4	12		CE - no water, continuous concrete cast ditch
135	THC 306	Tributary Glogovățu	km 465+458	20.6	6.5		CE - no water, continuous concrete cast ditch
136	THC 307	Channel Db16	km 472+694	13.6	6		CE - no water, continuous concrete cast ditch
137	THC 308	Channel VC2-Db2	km 476+752	19.6	6		CE - no water, continuous concrete cast ditch
138	THC 309	Channel VC2	km 477+700	37.1	22.3		CE - no water, continuous concrete cast ditch
TRONSON RECAȘ - HORIA				510,8	176,2		
1	THC 310	Channel valley	Km 485+642	33,7	4		valley – no water
2	THC 311	Channel valley	490+715	19,1	6,2		valley – no water
3	THC 312	Channel valley	492+907	26,4	13		valley – no water

4	THC 313	Channel crossing	494+295	21,9	7		CE - no water, continuous concrete cast ditch
5	THC 314	Channel crossing	494+891	30,6	17		CE - no water, continuous concrete cast ditch
6	THC 315	Valley	501+599	30	16		valley – no water
7	THC 316	Channel crossing	503+557	12,8	6,2		CE - no water, continuous concrete cast ditch
8	THC 317	Valley crossing Fiscutului	503+920	55,6	14		CE - no water, continuous concrete cast ditch
9	THC 318	Channel crossing Valley Mica	508+010	18	5,2		CE - no water, continuous concrete cast ditch
10	THC 319	Channel crossing	510+181	16,4	4		CE - no water, continuous concrete cast ditch
11	THC 320	Channel crossing	511+209	19,6	6		CE - no water, continuous concrete cast ditch
12	THC 321	Channel crossing ADII	511+586	58,3	15,2		CE - no water, continuous concrete cast ditch
13	THC 322	Channel crossing	513+306	27,5	13,1		CE - no water, continuous concrete cast ditch

14	THC 323	Channel crossing	513+496	20	5		CE - no water, continuous concrete cast ditch
15	THC 324	Valley crossing Livezile mici	514+564	27	12,3		CE - no water, continuous concrete cast ditch
16	THC 325	Channel crossing Valley Sanleani	517+020	25,4	9		CE - no water, continuous concrete cast ditch
17	THC 326	Channel crossing	527+531	21,1	5		CE - no water, continuous concrete cast ditch
18	THC 327	Channel crossing	527+876	20,6	7		CE - no water, continuous concrete cast ditch
19	THC 328	Channel crossing CA1-3	528+627	26,8	11		CE - no water, continuous concrete cast ditch

Appendix 10.1 Transport Estimates

528000	distance (m) of the pipeline
12	piece length (m)
44000	no. of pieces
2	no of pieces per truck
22000	no of truck journeys
total number of trips	44000

total distance is overestimated as each trip is assumed to be to the furthest point (point half way between the cities) from the city along the pipeline								
	Location	**pipeline - actual distance**	**length of the pipeline between cities**	**length of the pipeline served from the nearest train station**			**Note**	**% of route served from cities**
		km	**km**	**km**	**km**	**total (km)**	**see explain. below**	**%**
end	Horia	528	47.7	47.7		47.7		9.0
	Recas	480.3	137.1	68.55		68.55		13.0
	hateg	343.2	146.5	73.25	68.55	141.8		26.9
	Hurezani	196.7	116.7	58.35	73.25	131.6		24.9
	Corbu	80	80	40	58.35	98.35	*	18.6
start	Podisor	0	0	40		40	**	7.6
						528		100

* *second half (40km) of the pileine between Podisor and Corbu is severed from corbu as is the first half of the pipeline route between Corbu and Hurezani*

** *first half (40km) of the pipeline between Podisor and Corbu is served from Podisor*

nearest train station to the main city along the route	**railway distance (km) between the main city with the railway and the city on the pipeline route**	**number of trips**	**total distance**		**fuel consumption**	**GHG emissions**
	km		km		kg	tCO2e
Arad	13.2	3,975	242,078		58,099	182
Timisoara	27.6	5,713	549,257		131,822	414

Deva	40.9	11,817	2,158,905		518,137	1,627
Craiova	58.1	10,967	2,080,377		499,290	1,568
Craiova	99.7	8,196	1,623,185		389,564	1,223
Bucharest	41	3,333	270,000		64,800	203
		44,000	6,923,801		1,661,712	5,218

Appendix 10.2 Total emissions

	Diesel	CO2	N2O	NOx	CO	NH3	NMVOC	PM10	PM2.5
	litres	tonnes	kg	tonnes	tonnes	kg	tonnes	tonnes	tonnes
construction	6,415,728	20,274	866.1	209.3	69.1	51.3	21.7	13.5	13.5
transport	1,661,712	5,218	21.6	55.5	12.6	21.6	3.2	1.6	

Appendix 10.3 Emission factors

Non road				
1.A.2.g.vii	Mobile Combustion in manufacturing industries and construction			
1.A.4.a.ii	Commercial/institutional: Mobile			
diesel				
			g/tonnes	g/kg
BC		fuel	1306	1.306
CH4	g/tonnes	fuel	83	0.083
CO	g/tonnes	fuel	10774	10.774
CO2	kg/tonnes	fuel	3160	3.16
N2O	g/tonnes	fuel	135	0.135
NH3	g/tonnes	fuel	8	0.008
NMVOC	g/tonnes	fuel	3377	3.377
NOx	g/tonnes	fuel	32629	32.629
PM10	g/tonnes	fuel	2104	2.104
PM2.5	g/tonnes	fuel	2104	2.104
TSP	g/tonnes	fuel	2104	2.104
Table 3.1				
file:///C:/Users/gpa77661/Downloads/1.A.4%20Non%20road%20mobile%20machinery%202016%20(1).pdf				
http://www.eea.europa.eu/publications/emep-eea-guidebook-2016				
http://www.eea.europa.eu/publications/emep-eea-guidebook-2016/part-b-sectoral-guidance-chapters/1-energy/1-a-combustion/1-a-4-non-road-1				

Road									
	HDVs	240	Typical fuel consumption (g/km)						
	Table 3-15: Tier 1 — Typical fuel consumption figures, per km, by category of vehicle								
	file:///C:/Users/gpa77661/Downloads/1.A.3.b.i-iv%20Road%20transport%202016%20update%20Dec2016.pdf								
	kg CO2 per kg of fuel1	(g/kg fuel							
BC									
CH4									
CO		7.58	Table 3-5: Tier 1 emission factors for CO and NMVOCs						
CO2	3.14		Table 3-12: Tier 1 CO2 emission factors for different road transport fossil fuels						
N2O		0.051							
NH3		0.013							
NMVOC		1.92	Table 3-5: Tier 1 emission factors for CO and NMVOCs						
NOx		33.37	Table 3-6: Tier 1 emission factors for NOX and PM						
PM		0.94	Table 3-6: Tier 1 emission factors for NOX and PM						
PM2.5									
TSP									

			file:///C:/Users/gpa77661/Downloads/1.A.3.b.i-iv%20Road%20transport%202016%20update%20Dec2016.pdf		
			http://www.eea.europa.eu/publications/emep-eea-guidebook-2016		
			http://www.eea.europa.eu/publications/emep-eea-guidebook-2016/part-b-sectoral-guidance-chapters/1-energy/1-a-combustion/1-a-3-b-i		

Electricity				
0.488	tCO2/MWh			
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69554/pb13773-ghg-conversion-factors-2012.pdf				
	http://www.sunearthtools.com/en/tools/CO2-emissions-calculator.php			

Appendix 10.4 GHG – Operational

Operations

Stage 1

Compressor stations	3		
Compressor groups per station	2	1 active	1 idle
Total number of active compressors	3		
Each group power	5	MW	
Total power	15	MW	
Total electricity consumption	131400	MWh	

Stage 2

Compressor groups per station	3	2 active	1idle
Total number of active compressors	6		
Each group power	5	MW	
Total power	30	MW	
Total electricity consumption	262800	MWh	

Hours in operations	24
Days per year of operation	365

Appendix 11.1 Noise and Vibration Glossary

Acoustic barrier Solid walls or partitions, solid fences, earth mounds, buildings, etc used to reduce noise, without eliminating it.

Air-borne noise This refers to noise which is fundamentally transmitted by way of the air and can be attenuated by the use of barriers and walls placed physically between the noise and receiver.

Ambient sound The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.

Assessment Period The period in a day over which assessments are made.

Audible range The limits of frequency which are audible or heard as sound. The normal ear in young adults detects sound having frequencies in the region 20 Hz to 20 kHz, although it is possible for some people to detect frequencies outside these limits.

Background Noise Background noise is the term used to describe the noise measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).

Broadband Containing the full range of frequencies.

Decibel [dB] The level of noise is measured objectively using a Sound Level Meter. This instrument has been specifically developed to mimic the operation of the human ear. The human ear responds to minute pressure variations in the air. These pressure variations can be likened to the ripples on the surface of water but of course cannot be seen. The pressure variations in the air cause the eardrum to vibrate and this is heard as sound in the brain. The stronger the pressure variations, the louder the sounds are heard. The range of pressure variations associated with everyday living may span over a range of a million to one. On the top range may be the sound of a jet engine and on the bottom of the range may be the sound of a pin dropping.
Instead of expressing pressure in units ranging from a million to one, it is found convenient to condense this range to a scale 0 to 120 and give it the units of decibels.

The following are examples of the decibel readings of every day sounds;

Four engine jet aircraft at 100m	120 dB
Riveting of steel plate at 10m	105 dB
Pneumatic drill at 10m	90 dB
Circular wood saw at 10m	80 dB
Heavy road traffic at 10m	75 dB
Telephone bell at 10m	65 dB
Male speech, average at 10m	50 dB
Whisper at 10m	25 dB
Threshold of hearing, 1000 Hz	0 dB

dB(A): A-weighted decibels The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not perceived to be as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched

on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.

Free-Field A situation in which the radiation from a sound source is completely unaffected by the presence of any reflecting surfaces.

Heavy vehicle Heavy vehicles are assumed to be buses, rigid trucks and semi trailer trucks with a weight greater than 3 tonnes. Also heavy vehicles can be defined in terms of length as buses, or trucks with a length exceeding 5.25 metres.

Ln noise Descriptors As noise varies with time, a single noise value cannot adequately define the noise ambient. For this reason, the acoustic environment is described using a number of noise level descriptors as follows;

- **L10** The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
- **L90** The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
- **Leq** The Equivalent sound pressure level - the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.
- **LAmax** The maximum RMS A-weighted sound pressure level occurring within a specified time period.

Loudness A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on. That is, the sound of 85 dB is 400 times the loudness of a sound of 65 dB.

Microphone An electro acoustic transducer which receives an acoustic signal and delivers a corresponding electric signal.

Noise Sound which a listener does not wish to hear.

Noise monitor A sound level meter.

Rating Level The noise level of an industrial noise source which includes an adjustment for the character of the noise. Used in BS 4142

Rw The weighted sound reduction index is a laboratory measurement of the sound insulating properties of a building material or building element

Sound A fluctuation of air pressure which is propagated as a wave through air.

Sound Level Meter An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.

Sound Pressure Level The fluctuations in air pressure, from the steady atmospheric pressure, created by sound, when measured on the decibel scale.

Appendix 11.2 Settlements along the BRUA route

Key

-	Passes through settlement
-	Light red, if closer than 50m
-	Dark yellow, if between 50 and 150 m
-	Light yellow, if between 150 and 250m

Settlement	Around km point (as per BRUA route markers)	Distance to pipeline at nearest point (m)
Dealu	4	0.0
Marsa	12	136.5
Poeni	30	210.8
Purcareni	47	68.6
Palanga	51	99.2
Adunati	56	104.1
Caldararu	61	165.3
Strambeni	61	131.1
Urlueni	76	127.0
Afrimesti	77	0.0
Zuvelcati	77	152.3
Corbu	82	0.0
Chiteasca	96	5.5
Negreni	96	124.4
Cherlestii Mosteni	119	0.0
Mamura	121	144.0
Valea Caselor	137	154.7
Mazili	139	88.9
Sutesti	142	53.8
Streminoasa	144	0.0
Magureni	146	47.5
Gusoieni	148	0.0
Burdalesti	150	196.7
Maciuceni	161	115.6
Oveselu	162	144.0
Unamed	163	10.7
Dancai	166	0.0
Tetoiu	170	25.1
Tetoiu	171	64.6
Zatreni	178	62.6
Otetu	180	0.0
Halangesti	187	0.0
Unamed	192	0.0

Settlement	Around km point (as per BRUA route markers)	Distance to pipeline at nearest point (m)
Stejari	192	0.0
Hurezani	197	0.0
Andreesti	207	0.0
Frasin	210	0.0
Viersani	215	110.3
Viersani	218	37.7
Vidin	224	148.2
Pojogeni	229	66.6
Pojogeni	231	110.9
Budieni	238	171.7
Ungureni	238	137.4
Balanesti	249	0.0
Tetila	257	0.0
Sambotin	262	92.5
Arsura	266	0.0
Schela	269	0.0
Lupeni	294	157.4
Vulcan	297	26.7
Dealu Babii	299	0.0
Baru	315	0.0
Rau Alb	329	51.6
Barastii Hategului	337	0.0
Nalatvad	340	130.3
Totesti	344	206.4
Breazova	353	246.1
Sarmizegetusa	354	34.0
Zeicani	359	119.2
Bucova	364	0.0
Unamed	371	0.0
Valea Bistrei	384	68.3
Otelu Rosu	391	95.3
Glimboca	394	56.1
Obreja	401	78.3
Iaz	402	87.3
Jupa	407	216.8
Prisaca	412	138.0
Jena	425	141.1
Gavojdia	428	217.6
Lugojel	438	209.4
Lugoj	443	0.0

Settlement	Around km point (as per BRUA route markers)	Distance to pipeline at nearest point (m)
Costeiu	451	4.5
Gruni	455	0.0
Sanovita	462	203.8
Petrovaselo	475	162.0
Herneacova	482	44.3
Salciua Noua	487	230.5
Remetea Mica	494	28.1
Masloc	499	152.0
Fantanele	514	208.7

Appendix 11.3 Typical plant and equipment used for construction activities

General Construction Activities

1 Site Clearance

Plant	No.	LAeq @10m
Bulldozer	1	79
Wheeled loader	1	76
Tracked Excavator	1	76

2 Trench Excavation

Plant	No.	LAeq @10m
Tracked Excavator	1	76
Dumper	1	76
Diesel Generator	1	65
Water Pump	1	74

3 Pipe Laying & Backfilling of Trench

Plant	No.	LAeq @10m
Tracked excavator	1	76
Pipe Bender	1	80
Welder	1	74
Dumper	1	74
Tracked crane (moving)	1	86
Tracked crane (idling)	1	71
Diesel Generator	1	75

Construction Activities in Specific Areas

4 Excavation in hard rock areas

Plant	No.	LAeq @10m
Excavator mounted rock breaker 125kw	1	93
Loading rock to lorry	1	85
Lorry moving	1	83
Hand held power tools	1	77
Diesel generator	1	75

5 Horizontal drilling technique

Plant	No.	LAeq @10m
Horizontal drilling technique	1	94
Loading rock to lorry	1	85
Lorry moving	1	83
Hand held power tools	1	77
Diesel generator	1	75
Water pump	1	74

6 Creation of Cofferdam

Plant	No.	LAeq @10m
Diesel powered pile hammer	1	100
Tracked excavator	1	76
Lorry moving	1	83
Hand held power tools	1	77
Diesel generator	1	75
Water pump	1	74

7 Concreting Foundations and Floor Slab

Plant	No.	LAeq @10m
Truck mixer	1	88
Lorry mounted concrete pump	1	90
Diesel Generator	1	65

Poker Vibrators	2	73

8 Concrete Compaction of Foundations and Floor Slab

Plant	No.	LAeq @10m
Generator	1	94
Poker Vibrator	1	94
Compressor	1	77
Diesel Generator for lighting	1	75

Appendix 11.4 Complaints Log

Example of Complaint Log

Environmental Procedure		**Page 1 of 2**
Noise and/or Vibration Complaints Procedure		**Revision:**
		Revision Date:
		Approved By:
Document Reference:		**Date Next Revision Due:**

Noise and/or Vibration Complaints Procedure	
Purpose	To log the details of any complaint received at the site relating to noise and/or vibration and to record remedial actions made and undertaken.
Other Relevant Documents	Construction Noise and Vibration Management Plan. Date: Ref:
Responsibilities	The Construction Manager is to be notified of all Noise and/or Vibration complaints received at the site.

Procedure

- Any Noise and/or Vibration complaint received will be dealt with by the Construction Manager or another nominated person of sufficient seniority to control works;
- If a complaint is made the form included below will be completed and a copy will be kept in the site office, a copy supplied to the Consultant overseeing Noise and Vibration compliance and will be made available for inspection by the Local Planning Authority upon request;
- After details of the complaint have been compiled the cause(s) will be investigated with reference to:
  1. The activities taking place on site at the time;
  2. The timing of the complaint (whether weekday, weekend, daytime, evening, overnight) etc.;
- The likely reasons for the complaint will be added to the form and the complainant will be contacted as appropriate;
- The complaint will be investigated and the feasibility of making changes to the activities/operations responsible for the issue will be considered;
- Details of actions taken and updated plans will be held on file and made available to the Local Planning Authority upon request.
- The complaint will be followed up following any remedial actions to ensure that the issue has been appropriately addressed.

	Noise and/or Vibration Complaints Form			
	Date Recorded:		**Reference Number:**	
Name and address of caller (complainant)				
Telephone Number				
Name and Grade of person logging complaint				
Details of Complaint				
Date, time and duration of noise and/or vibratory event				
Noise and/or Vibration Description e.g. perception, damage				
Any other comments from the complainant				
Weather Conditions (e.g. dry, rain, fog, snow)				
Prevailing Wind Direction and Strength (e.g. light, steady, strong, gusting)				
Have any other previous complaints been received of this nature?	YES / NO			
Have any other previous complaints been received from this source?	YES / NO	If yes, number and dates:		
Any other relevant information (E.g. Any unusual activities taking place within the area inc. construction)				
Potential on site sources that could give rise to complaint based upon description				
Operating conditions / activities at the time of complaint				
Follow-up Actions				
Date and time complainant contacted				
Further actions taken				
Amendments required to the CEMP	YES / NO	Amendments to the CEMP completed	YES / NO	
Form Completed By:		Signed:		

Complaint Procedure and Example Complaint Log Form

Environmental Procedure		**Page 1 of 2**
Noise and/or Vibration Complaints Procedure		**Revision:**
		Revision Date:
		Approved By:
Document Reference:		**Date Next Revision Due:**

Noise and/or Vibration Complaints Procedure	
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Procedure

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- After details of the complaint have been compiled the cause(s) will be investigated with reference to:

  3. The activities taking place on site at the time;

  4. The timing of the complaint (whether weekday, weekend, daytime, evening, overnight) etc.;

- The likely reasons for the complaint will be added to the form and the complainant will be contacted as appropriate;
- The complaint will be investigated and the feasibility of making changes to the activities/operations responsible for the issue will be considered;
- Details of actions taken and updated plans will be held on file and made available to the Local Planning Authority upon request.
- The complaint will be followed up following any remedial actions to ensure that the issue has been appropriately addressed.

	Noise and/or Vibration Complaints Form			
	Date Recorded:		**Reference Number:**	
Name and address of caller (complainant)				
Telephone Number				
Name and Grade of person logging complaint				
Details of Complaint				
Date, time and duration of noise and/or vibratory event				
Noise and/or Vibration Description e.g. perception, damage				
Any other comments from the complainant				
Weather Conditions (e.g. dry, rain, fog, snow)				
Prevailing Wind Direction and Strength (e.g. light, steady, strong, gusting)				
Have any other previous complaints been received of this nature?	YES / NO			
Have any other previous complaints been received from this source?	YES / NO	If yes, number and dates:		
Any other relevant information (E.g. Any unusual activities taking place within the area inc. construction)				
Potential on site sources that could give rise to complaint based upon description				
Operating conditions / activities at the time of complaint				
Follow-up Actions				
Date and time complainant contacted				
Further actions taken				
Form Completed By:			Signed:	

Appendix 12.1: Species Valuation Table

Table 12.1 Species Valuation Table

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
Northern goshawk	*Accipiter gentilis*	LC	6,7,3	3	
Golden eagle	*Aquila chrysaetos*	LC	7	3	BD 1
Eurasian Sparrow-hawk	*Accipiter nisus*	LC	6, 7, 3	3	
Great Reed Warbler	*Acrocephalus arundinaceus*	LC	5	2	
Marsh Warbler	*Acrocephalus palustris*	LC	5, 6, 7	2	
Sedge Warbler	*Acrocephalus schoenobaenus*	LC	5	2	
Eurasian Reed-Warbler	*Acrocephalus scirpaceus*	LC	5	2	
Pheasant's Eye	*Adonis vernalis*	LC	3	2	
Long Tailed Tit	*Aegithalos caudatus*	LC	6, 7, 2	2	
Tengmalm's Owl	*Aegolius funereus*	LC	7	3	BD 1
Eurasian Skylark	*Alauda arvensis*	LC	3	2	
Bleak	*Alburnus Alburnus*	LC	5	1	
Pintail	*Anas acuta*	LC	5	2	
Northern shoveler	*Anas clypeata*	LC	5	2	
Eurasian Teal	*Anas crecca*	LC	5	2	
Wigeon	*Anas penelope*	LC	5	2	
Common Mallard	*Anas platyrhynchos*	LC	5	2	
Gadwall	*Anas strepera*	LC	5	2	
Slow Worm	*Anguis fragilis*	LC	3, 6, 2, 1	3	
White-fronted Goose	*Anser albifrons*	LC	1, 5	3	
Greylag Goose	*Anser anser*	LC	5, 3, 1	3	
Lesser white-fronted goose	*Anser erythropus*	VU	1, 5	4	BD 1
Taiga Bean Goose	*Anser fabalis fabalis*	LC	5, 3, 1	3	
Tundra Bean Goose	*Anser fabalis rossicus*	LC	5, 3, 1	3	

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
Tawny Pipit	*Anthus campestris*	LC	3,2,6	3	BD 1
Red-Throated Pipit	*Anthus cervinus*	LC	3, 2, 6	2	
Meadow Pipit	*Anthus pratensis*	NT	3, 2, 6	2	
Water pipit	*Anthus spinoletta*	LC	3, 2, 6	2	
Tree Pipit	*Anthus trivialis*	LC	7, 6, 2	1	
Swift	*Apus apus*	LC	2, 3, 5, 6, 7	2	
Alpine Swift	*Apus melba*	LC	2, 3, 5, 6, 7	2	
Lesser spotted Eagle	*Aquila pomaria*	LC	7	3	
Bearberry	*Arctostapylos uva-ursi*	LC	6, 7	1	
Grey Heron	*Ardea cinerea*	LC	3, 2, 6	2	
Wolf's bane	*Arnica montana*	LC	3, 6, 7	1	
Short-Eared Owl	*Asio flammeus*	LC	3, 6	3	BD 1
Long-Eared Owl	*Asio otus*	LC	7	3	
Aral Asp	*Aspius aspius*	LC	5	3	HD 2
	Asplenium adulterinum	LC	7	3	HD 2
Broad-Clawed Crayfish	*Astacus astacus*	VU	5	3	
Little Owl	*Athene noctua*	LC	2, 3, 7, 1	2	
Aubrieta	*Aubrieta columnae*	Not evaluated	3, 4, 5	2	
Stone crayfish	*Austropotamobius torrentium*	Not evaluated	5	3	HD 2
Tufted Duck	*Aythia fuligula*	LC	5	2	
Greater Scaup	*Aythia marila*	LC	5	3	
Ferruginous Duck	*Aythia nyroca*	NT	5	3	BD 1
Pochard	*Aythya ferina*	LC	1, 5	2	
Barbastelle	*Barbastella barbastellus*	NT	7, 6, 3, 2, 1	4	HD 2;4
Mediterranean Barbel	*Barbus meridionalis*	NT	5	3	HD 2

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
Fire-Bellied Toad	*Bombina bombina*	LC	5, 1, 2, 6, 7, 8	4	HD 2;4
Yellow-Bellied Toad	*Bombina variegata*	LC	5, 1, 2, 6, 7, 8	4	HD 2;4
Hazel Grouse	*Bonasa bonaisia*	LC	7	2	
Bittern	*Botaurus stellaris*	LC	1, 3, 7	2	BD 1
A beetle	*Bothrideres bipunctatus*	Not evaluated	7	1	
Leathery moonwort	*Botrychium multifidum*	DD	7	1	
Eagle Owl	*Bubo bubo*	LC	7	3	BD 1
Common Goldeneye	*Bucephala clangula*	LC	5	2	
Common Toad	*Bufo bufo*	LC	5, 2, 1, 8	1	
Green Toad	*Bufo viridis*	LC	5, 2, 6, 1	3	HD 4
Stone Curlew	*Burhinus oedicnemus*	LC	5	2	BD 1
Common Buzzard	*Buteo buteo*	LC	3, 1, 6, 7	2	
Rough-legged Buzzard	*Buteo lagopus*	LC	3, 1, 6	3	
Dunlin	*Calidris alpina*	LC	5	2	
Red Knot	*Calidris canutus*	NT	5	2	
Jersey Tiger	*Callimorpha quadripunctaria*	Not evaluated	6, 7, 3, 2, 1	3	HD 2
Blue Bell	*Campanula serrata*	LC	3	4	HD 2;4
Golden Jackal	*Canis aureus*	LC	6, 3, 7	3	
Wolf	*Canis lupus*	LC	7	5	HD 2;4
Roe-Deer	*Capreolus capreolus*	LC	7, 3, 1, 6	2	
European nightjar	*Caprimulgus europaeus*	LC	6, 7	3	BD 1
A beetle	*Carabus hungaricus*	Not evaluated	7	3	HD 4
A lady’s smock	*Cardamine glauca*	Not evaluated	3, 7	3	
Common Linnet	*Carduelis cannabina*	LC	3, 1, 6	1	

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
Goldfinch	*Carduelis carduelis*	LC	3, 1, 6	1	
Greenfinch	*Carduelis chloris*	LC	3, 1, 6	1	
Eurasian Siskin	*Carduelis spinus*	LC	3, 1, 6	2	
Thin-Spiked Wood-Sedge	*Carex strigosa*	Not evaluated	7	1	
A knapweed	*Centaurea affinis*	Not evaluated	3, 4, 6, 7	1	
Feather-Head Knapweed	*Centaurea trichocephala*	Not evaluated	3	1	
White helleborine	*Cephalanthera damasonium*	LC	3, 7	1	
Narrow leaved helleborine	*Cephalanthera longifolia*	LC	7	1	
A flowering plant	*Cephalaria radiata*	Not evaluated	3	1	
Great Capricorn Beetle	*Cerambyx cerdo*	VU	7	3	HD 2;4
Short-Toed Treecreeper	*Certhia brachydactyla*	LC	7, 6, 2	3	
Eurasian Treecreeper	*Certhia familiaris*	LC	7, 6, 2	2	
Red-Deer	*Cervus elaphus*	LC	7	3	
Cetti's Warbler	*Cettia cetti*	LC	7, 2	2	
Little Ringed Plover	*Charadrius dubius*	LC	5	3	
White-winged Black Tern	*Chlidonias leucopterus*	LC	5	2	
White Stork	*Ciconia ciconia*	LC	5	3	BD 1
Black Stork	*Ciconia nigra*	LC	5	3	BD 1
Short-Toed Eagle	*Circaetus gallicus*	LC	7	3	BD 1
Hen Harrier	*Circus cyaneus*	NT	3, 7	3	BD 1
Thistle	*Cirsium ligulare*	Not evaluated	3	1	
Spined Loach	*Cobitis taenia*	LC	5	3	HD 2
Hawfinch	*Coccothraustes coccothraustes*	LC	6, 7, 2	2	
ornate blulet	*Coenagrion ornatum*	NT	5, 8	3	HD 2
Danube Clouded Yellow	*Colias myrmidone*	EN	3	5	HD 2;4

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
European Whip Snake	*Coluber caspius*	LC	3, 5	3	HD 4
Domestic Pigeon	*Columba livia*	LC	7, 2, 3	1	
Stock Dove	*Columba oenas*	LC	7, 2	2	
Common Wood Pigeon	*Columba palumbus*	LC	7, 2	1	
A bug	*Coptosoma mucronatum*	Not evaluated	3, 6	1	
European Roller	*Coracias garrulus*	LC	3	3	BD1
Smooth Snake	*Coronella austriaca*	LC	6, 7	3	HD 4
A vetch	*Coronilla coronata*	Not evaluated	3, 6	1	
Raven	*Corvus corax*	LC	7, 3, 1, 2	2	
Hooded Crow	*Corvus corone cornix*	LC	3, 1, 2, 8	1	
Crow	*Corvus corone corone*	LC	3, 1, 2	1	
Rook	*Corvus frugilegus*	LC	3, 1, 2, 8	1	
Eurasian Jackdaw	*Corvus monedula*	LC	3, 1, 2, 6, 8	1	
Bullhead	*Cottus gobio*	LC	5	3	HD 2
Quail	*Coturnix coturnix*	LC	3	2	
Corncrake	*Crex crex*	LC	1, 3, 5, 6, 7	3	BD 1
Common Hamster	*Cricetus cricetus*	LC	3	3	HD 4
Bicolored Shrew	*Crocidura leucodon*	LC	3, 5, 2, 5	2	
Lesser Shrew	*Crocidura suaveolens*	LC	3, 5, 2, 5	2	
A beetle	*Cucujus cinnaberinus*	NT	7	3	HD 2; 4
Common Cuckoo	*Cuculus canorus*	LC	7, 6, 2	1	
Whooper Swan	*Cygnus cygnus*	LC	5	3	BD 1
Mute Swan	*Cygnus olor*	LC	5	1	
Heath spotted orchid	*Dactylorhiza maculata*	LC	3, 6	1	
Common House Martin	*Delichon urbica*	LC	2, 1	1	
White-backed Woodpecker	*Dendrocopos leucotos*	LC	7	3	BD 1
Great Spotted Woodpecker	*Dendrocopos major*	LC	7, 2	1	
Middle Spotted Woodpecker	*Dendrocopos medius*	LC	7	3	BD 1
Lesser Spotted Woodpecker	*Dendrocopos minor*	LC	7, 2	1	

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
A beetle	*Diaclina testudinea*	Not evaluated	3, 7	1	
A pink	*Dianthus trifasciculatus*	Not evaluated	7	1	
A beetle	*Dicerca berolinensis*	Not evaluated	6,7	1	
A moss	*Dicranum viride*	Not evaluated	7	3	HD 2
A moth	*Dioszeghyana schmidtii*	Not evaluated	7	3	HD 2; 4
Black Woodpecker	*Dryocopus martius*	LC	7	3	BD 1
Forest Dormouse	*Dryomys nitedula*	LC	7	3	HD 4
Great White Egret	*Egretta alba*	LC	1, 3, 5	3	BD 1
Aesculapian Snake	*Elaphe longissima*	LC	6	3	HD 4
Garden Dormouse	*Eliomys quercinus*	NT	7, 6, 3, 2	3	
Rock Bunting	*Emberiza cia*	LC	3	2	
Cirl Bunting	*Emberiza cirlus*	LC	1	2	
Yellowhammer	*Emberiza citrinella*	LC	1	2	
Ortolan Bunting	*Emberiza hortulana*	LC	1	3	BD 1
Black-Headed Bunting	*Emberiza melanocephala*	LC	6	2	
Little Bunting	*Emberiza pusilla*	LC	1	2	
Common-Red Bunting	*Emberiza schoeninclus*	LC	5	2	
European Pond Turtle	*Emys orbicularis*	NT	5	4	HD 2;4
Serotine	*Eptesicus serotinus*	LC	1, 3, 7	3	DH 4
Western Hedgehog	*Erinaceus europaeus*	LC	6, 7	2	
A butterfly	*Eriogaster catax*	Not evaluated	7	3	HD 2; 4
European Robin	*Erithacus rubecula*	LC	6	2	
A beetle	*Eubrachium hispidulum*	Not evaluated	7	1	
Carpathian Brook Lamprey	*Eudontomyzon danfordi*	LC	5	4	HD 2
Danubian Brook Lamprey	*Eudontomyzon vladykovi*	LC	5	4	HD 2

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
Marsh Fritillary	*Euphydryas aurinia*	LC	3	3	HD 2
Scarce Fritillary	*Euphydryas maturna*	DD	7, 6	4	HD 2;4
A beetle	*Eurythyrea austriaca*	Not evaluated	7	1	
Eurasian Hobby	*Falco subbuteo*	LC	3, 6, 7, 2, 1	3	
Kestrel	*Falco tinunculus*	LC	3, 6, 7, 2, 1	3	
Red-Footed Falcon	*Falco vespertinus*	NT	3, 6, 7, 2	4	BD 1
Wild-Cat	*Felis silvestris*	LC	7, 6	3	HD 4
A grass	*Festuca panciciana*	Not evaluated	3	1	
A grass	*Festuca pseudodalmatica*	Not evaluated	3	1	
Collared Flycatcher	*Ficedula albicollis*	LC	1, 3, 5, 6, 7	3	BD 1
European-Pied Flycatcher	*Ficedula hypoleuca*	LC	7, 6	2	
Red-breasted Flycatcher	*Ficedula parva*	LC	1, 3, 5, 6, 7	3	BD 1
Chaffinch	*Fringilla coelebs*	LC	3,1	2	
Brambling	*Fringilla montifringilla*	LC	1, 3, 5, 6, 7	2	
Common Coot	*Fulica atra*	LC	5	2	
Snowdrop	*Galanthus nivalis*	NT	7	1	
Crested Lark	*Galerida cristata*	LC	3, 1	2	
Common Snipe	*Gallinago gallinago*	LC	5	2	
Common Moorhen	*Gallinula chloropus*	LC	5	2	
Jay	*Garrulus glandarius*	LC	7, 6, 2	1	
Genoa Broom	*Genista januensis*	Not evaluated	6, 7	1	
Marsh Gladiolus	*Gladiolus palustris*	DD	5	3	HD 2;4
Pygmy Owl	*Glaucidium passerinum*	LC	7	3	BD 1
Edible Dormouse	*Glis glis (Myoxus glis)*	LC	7	2	
Kessler's gudgeon	*Gobio kessleri*	LC	5	3	HD 2

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
Danubian gudgeon	*Gobio uranoscopus*	LC	5	3	HD 2
Fisher’s Estuarine Moth	*Gortyna borelii lunata*	DD	3	4	HD 2;4
Balon's Ruffe	*Gymnocephalus baloni*	LC	5	3	DH 2; 4
Striped Ruffe	*Gymnocephalus schraetzer*	Not evaluated	5	3	DH 2; 4
Burgundy snail	*Helix pomatia*	LC	1, 3, 5, 6	1	
Eurasian Oystercatcher	*Hematopus ostralegus*	NT	5	4	
A member of the buttercup family	*Hepatica transsilvanica*	Not evaluated	3, 7	1	
Musk Orchid	*Herminium monorchis*	DD	3, 7	1	
Icterine Warbler	*Hippolais icterina*	LC	3, 6	2	
Eastern Olivaceous Warbler	*Hippolais palida*	LC	3, 6	2	
A medicinal leech	*Hirudo medicinalis*	Not evaluated	5, 8	1	
Red-rumped Swallow	*Hirundo daurica*	LC	1, 2, 3, 5, 6, 7	1	
Swallow	*Hirundo rustica*	LC	2, 1, 3	2	
European Tree Frog	*Hyla arborea*	LC	5, 2	3	HD 4
A St John’swort	*Hypericum rochelii*	Not evaluated	3, 4	1	
Steppe Iris	*Iris aphylla ssp. hungarica*	Insufficient data	3	4	HD 2
Steppe Grasshopper	*Isophya costata*	LC	3	3	HD 2;4
Bush Grasshopper	*Isophya stysi*	LC	3	3	HD 2;4
Little Bittern	*Ixobrychus minutus*	LC	6	3	BD 1
Eurasian Wryneck	*Jynx torquilla*	LC	7	2	
Common Lizard	*Lacerta (Zootoca) vivipara*	LC	3, 1, 2	1	
Sand Lizard	*Lacerta agilis*	LC	3, 1, 2	3	HD 4
Meadow Lizard	*Lacerta praticola*	NT	3, 2, 1	3	
Balkan Lizard	*Lacerta trilineata*	LC	3, 2, 1, 4	3	HD 4
Green Lizard	*Lacerta viridis*	LC	3, 2, 1, 4	2	HD 4
Red-backed Shrike	*Lanius collurio*	LC	1, 3, 5, 6	3	BD 1
Great Grey Shrike	*Lanius excubitor*	LC	6	2	

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
Lesser grey shrike	*Lanius minor*	LC	3, 5, 6, 7	3	
Woodchat Shrike	*Lanius senator*	LC	6	2	
Yellow Legged-Gull	*Larus cachinnans*	LC	5	2	
Common Gull	*Larus canus*	LC	5	2	
Little Gull	*Larus minutus*	Not evaluated	5	2	
Black-headed Gull	*Larus ridibundus*	LC	5	2	
Fenton's Wood White	*Leptidea morsei*	NT	7	3	HD 2; 4
Souffia	*Leuciscus (Telestes) souffia*	LC	5	3	HD 2
Common Dace	*Leuciscus leuciscus*	LC	5	3	
large white-faced darter	*Leucorrhinia pectoralis*	LC	5, 8	3	HD 2; 4
Fen orchid	*Liparis loeselii*	NT	3, 8	3	HD 2
River Warbler	*Locustella fluviatilis*	LC	5	3	
Savi's Warbler	*Locustella luscinioides*	LC	5	3	
Burbot	*Lota Lota*	LC	5	1	
Greater birds-foot trefoil	*Lotus uliginosus*	Not evaluated	3	1	
Stag Beetle	*Lucanus cervus*	NT	7	3	HD 2
Woodlark	*Lullula arborea*	LC	6, 7	3	BD 1
Thrush Nightingale	*Luscinia luscinia*	LC	6, 7, 2	2	
Common Nightingale	*Luscinia megarhynchos*	LC	6, 7, 2	2	
Otter	*Lutra lutra*	NT		5	HD 2;4
Large Copper	*Lycaena dispar*	NT	5	3	HD 2; 4
A club moss	*Lycopodium annotinum*	Not evaluated	7	1	
A club moss	*Lycopodium clavatum*	LC	7	1	
Jack Snipe	*Lymnochryptes minimus*	LC	5	3	
Eurasian Lynx	*Lynx lynx*	LC	7	5	HD 2;4

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
Scarce Large Blue	*Maculinea teleius*	NT	3	4	HD 2;4
Water clover	*Marsilea quadrifolia*	NT	5, 8	3	HD 2
Beech Marten	*Martes foina*	LC	7, 6	2	
European Pine Marten	*Martes martes*	LC	7, 6, 2	3	DH-5
A medick	*Medicago polymorpha*	LC	1, 2, 3, 4, 6	1	
Badger	*Meles meles*	LC	6, 7, 2, 1	1	
A beetle	*Menephilus cylindricus*	Not evaluated	7	1	
Smew	*Mergus albellus*	LC	6	3	BD 1
Goosander	*Mergus merganser*	LC	6	2	
European Bee-Eater	*Merops apiaster*	LC	3, 1	2	
A beetle	*Metaclisa azurea*	Not evaluated	1, 3, 6, 7	1	
Corn Bunting	*Miliaria calandra*	LC	1, 3	2	
Common Bent-Wing Bat	*Miniopterus schreibersii*	NT	7, 6, 3, 2, 1	3	HD 2;4
A saxifrage	*Minuartia hirsuta*	Not evaluated	3, 6	1	
Mud Loach	*Misgurnis fossilis*	LC	5	3	HD 2
Rufous-Tailed Rock-Thrush	*Monticola saxatilis*	LC	3, 4	2	
White Wagtail	*Motacilla alba*	LC	1, 2, 3, 4, 5, 6, 7	1	
Grey Wagtail	*Motacilla cinerea*	LC	1, 2, 3, 4, 5, 6, 7	1	
Yellow Wagtail	*Motacilla flava*	LC	1, 2, 3, 4, 5, 6, 7	1	
Hazel Dormouse	*Muscardinus avellanarius*	LC	7	3	HD 4
Spotted Flycatcher	*Muscicapa striata*	LC	7, 6	2	
Stoat	*Mustela erminea*	LC	7, 3, 2, 1	2	
Weasel	*Mustela nivalis*	LC	7, 3, 2, 1	2	

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
A beetle	*Mycetophagus decempunctatus*	LC	1, 7	1	
Changing forget-me-not	*Myosotis discolor*	Not evaluated	1, 2, 3	1	
Lesser mouse-eared bat	*Myotis blythii*	NT	7, 6, 3, 2, 1	3	DH 2;4
Long fingered Bat	*Myotis capaccinii*	VU	7, 6, 3, 2, 1	3	HD 2;4
Geoffroy's Bat	*Myotis emarginatus*	LC	7, 6, 3, 2, 1	3	HD 2;4
Greater Mouse-Eared Bat	*Myotis myotis*	LC	7, 6, 3, 2, 1	3	HD 2;4
Whiskered Bat	*Myotis mystacinus*	LC	7, 6, 3, 2, 1	3	DH 4
Glis Glis	*Myoxus glis*	LC	6, 7	1	
Grass Snake	*Natrix natrix*	LC	5, 1, 2, 6	1	
Dice Snake	*Natrix tessellata*	LC	5	3	HD 4
A beetle	*Neatus picipes*	Not evaluated	7	1	
A beetle	*Nematodes filum*	DD	7	1	
A beetle	*Neomida haemorrhoidalis*	Not evaluated	7	1	
Miller's water shrew	*Neomys anomalus*	LC	5	2	
Water shrew	*Neomys fodiens*	LC	5	1	
Red Crested Pochard	*Netta rufina*	LC	5	2	
Noctule	*Nyctalus noctula*	LC	7, 6, 3, 2, 1	3	DH 4
Wheatear	*Oenanthe oenanthe*	LC	3	2	
Green snaketail dragonfly	*Ophiogomphus cecilia*	LC	5, 8	3	HD 2; 4
Green-winged orchid	*Orchis morio*	Not evaluated	3	1	
Elder-flowered Orchid	*Orchis sambucina*	LC	3	1	
Golden Oriole	*Oriolus oriolus*	LC	7, 6, 2	2	
Hermit Beetle	*Osmoderma eremita*	NT	7	4	HD 2;4
Scops Owl	*Otus scops*	LC	3, 2	2	
Clouded Apollo	*Parnassius mnemosyne*	NT	3, 7	3	HD 4
Coal Tit	*Parus ater*	LC	7	1	

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
Eurasian Blue Tit	*Parus caeruleus*	LC	7, 6, 2	1	
European Crested Tit	*Parus cristatus*	LC	7	1	
Sombre Tit	*Parus lugubris*	LC	5	2	
Great Tit	*Parus major*	LC	6, 7, 2, 1, 8	1	
Willow Tit	*Parus montanus*	LC	7	1	
Marsh Tit	*Parus palustris*	LC	5	2	
A broomrape	*Pedicularis baumgartenii*	Not evaluated	3, 6, 7	1	
European Spadefoot Toad	*Pelobates fuscus*	LC	5, 3, 2	3	HD 4
A beetle	*Peltis grossa*	LC	7	1	
Grey partridge	*Perdix perdix*	LC	3	1	
Honey Buzzard	*Pernis apivorus*	LC	7	3	BD 1
Cormorant	*Phalacrocorax carbo*	LC	5	2	
Pheasant	*Phasianus colchicus*	LC	3, 1	1	
Ruff	*Philomachus pugnax*	LC	5	3	BD 1
Black Redstart	*Phoenicurus ochruros*	LC	3	1	
Common Redstart	*Phoenicurus phoenicurus*	LC	2	1	
Transilvanian Grasshopper	*Pholidoptera transsylvanica*	LC	6, 5	3	HD 2;4
Common Minnow	*Phoxinus phoxinus*	LC	5	2	
Common Chiffchaff	*Phylloscopus collybita*	LC	6, 7, 2	2	
Woodwarbler	*Phylloscopus sibilatrix*	LC	6, 7, 2	2	
Willow Warbler	*Phylloscopus trochiulus*	LC	6, 7, 2	2	
Eurasian Magpie	*Pica pica*	LC	6, 2, 1	1	
Grey-headed Woodpecker	*Picus canus*	LC	7	3	BD 1
Green Woodpecker	*Picus viridis*	LC	7, 2	1	
A beetle	*Pilemia tigrina*	Not evaluated	7	3	HD 2;4

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
Common Pipistrelle	*Pipistrellus pipistrellus*	LC	1, 2, 3, 5, 6, 7	3	DH 4
A plantain	*Plantago holosteum*	Not evaluated	3, 6	1	
Brown Long-Eared Bat	*Plecotus auritus*	LC	1, 2, 3, 5, 6, 7	3	DH 4
Grey Long-Eared Bat	*Plecotus austraicus*	LC	1, 2, 3, 5, 6, 7	3	DH 4
Balkan Wall Lizard	*Podacis taurica*	LC	1, 3, 4	1	
Common Wall Lizard	*Podarcis muralis*	LC	1, 4	3	HD 4
Great Crested Grebe	*Podiceps cristatus*	LC	5	2	
A potentilla	*Potentilla haynaldiana*	Not evaluated	3, 5, 7	1	
Alpine Accentor	*Prunella collaris*	LC	3	2	
Dunnock	*Prunella modularis*	LC	7, 6	2	
Greater Pasque Flower	*Pulsatilla grandis*	LC	3	4	HD 2
Bullfinch	*Pyrrhula pyrrhula*	LC	1, 3, 6, 7	1	
Water Rail	*Rallus aquaticus*	LC	5	2	
Moor Frog	*Rana arvalis*	LC	5	3	HD 4
Agile Frog	*Rana dalmatina*	LC	5	3	HD 4
Edible Frog	*Rana esculenta*	LC	5	1	
Pool Frog	*Rana lessonae*	LC	5	3	HD 4
Marsh Frog	*Rana ridibunda*	LC	5	1	
Common Frog	*Rana temporaria*	LC	5	1	
A buttercup	*Ranuculus polyphyllus*	DD	5, 8	2	
Firecrest	*Regulus ignicapillus*	LC	7	2	
Common Firescrest	*Regulus regulus*	LC	7	2	
Mediterranean Horseshoe Bat	*Rhinolophus euryale*	NT	7, 6, 2, 1, 3	4	HD 2;4

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
Greater Horseshoe Bat	*Rhinolophus ferrumequinum*	LC	7, 6, 2, 1, 3	4	HD 2;4
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	LC	7, 6, 2, 1, 3	4	HD 2;4
Amur bitterling	*Rhodeus sericeus amarus*	Not evaluated	5	3	HD 2
Sand Martin	*Riparia riparia*	LC	5	2	
Rosalia Longicorn	*Rosalia alpina*	VU	7	3	HD 2;4
Alpine chamois	*Rupicapra rupicapra*	LC	7	2	
Butchers broom	*Ruscus aculeatus*	LC	6, 7	1	
Common Roach	*Rutilus rutilus*	LC	5	2	
Golden Spined Loach	*Sabanejewia aurata*	LC	5	3	HD 2
Romanian Loach	*Sabanejewia romanica*	NT	5	3	
Salamander	*Salamandra salamandra*	LC	5	3	
Whichat	*Saxicola rubetra*	LC	3	2	
Common Stonechat	*Saxicola torquata*	LC	3	2	
Red Squirrel	*Sciurus vulgaris*	LC	7	2	
Eurasian Woodcock	*Scolopax rusticola*	LC	7	3	
Common golden thistle	*Scolymus hispanicus*	Not evaluated	3, 5	1	
European Serin	*Serinus serinus*	LC	1, 3, 2	2	
Catfish	*Silurus glanis*	LC	5	1	
Eurasian Nuthatch	*Sitta europaea*	LC	7	2	
A whitebeam	*Sorbus borbasii*	Not evaluated	7	1	
Alpine shrew	*Sorex alpinus*	NT		3	
Balkan mole rat	*Spalax graecus*	NT		4	
European ground squirrel	*Spermophilus citellus*	VU		4	HD 2;4
Eurasian Collared-Dove	*Streptopelia decaocto*	LC	2, 3, 8	1	

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
European Turtle Dove	*Streptopelia turtur*	VU	7, 6, 2	4	
Tawny Owl	*Strix aluco*	LC	7, 6, 2, 1	3	
Ural Owl	*Strix uralensis*	LC	7	3	BD 1
European Starling	*Sturnus vulgaris*	LC	3, 1	1	
Wildboar	*Sus scrofa*	LC	7, 6, 1	1	
Blackcap	*Sylvia atricapilla*	LC	6, 7	1	
Garden Warbler	*Sylvia borin*	LC	5	1	
Common Whitethroat	*Sylvia communis*	LC	6, 7	1	
Lesser Whitethroat	*Sylvia curruca*	LC	3, 1	1	
Orphean Warbler	*Sylvia hortensis*	LC	7, 6	1	
Sardinian Warbler	*Sylvia melanocephala*	LC	3, 1, 2	1	
Little Grebe	*Tachybaptus ruficollis*	LC	5	1	
Shelduck	*Tadorna tadorna*	LC	5	1	
Hermann’s Tortoise	*Testudo hermanni*	NT	3, 6, 5	5	HD 2;4
Capercaillie	*Tetrao urogallus*	LC	7	3	BD 1
Grayling	*Thymallus thymallus*	LC	5	2	
Creeping thyme	*Thymus comosus*	Not evaluated		1	
Carpathian Tozzia	*Tozzia carpathica*	DD	3	4	HD 2
Spotted Redshank	*Tringa erythropus*	LC	5	2	
Green Sandpipper	*Tringa ochropus*	LC	5	2	
Alpine Newt	*Triturus alpestris alpestris*	LC	5	3	
Great Crested Newt	*Triturus cristatus*	LC	5	3	HD 2;4
Smooth Newt	*Triturus vulgaris*	LC	3, 5, 8	2	
Common Newt	*Triturus vulgaris ampelensis*	LC	5, 3	3	HD 2;4
Wren	*Troglodytes troglodytes*	LC	6	2	
Redwing	*Turdus iliacus*	NT	7, 6	2	
Blackbird	*Turdus merula*	LC	6, 7, 2, 8	1	

Common Name	Latin Name	IUCN Conservation Status	Associated habitat / biome	Value	**Birds Directive Annexe 1 OR Habitats Directive HD 2 or 4**
Song Thrush	*Turdus philomelos*	LC	6, 7, 2	1	
Fieldfare	*Turdus pillaris*	LC	6, 7, 2	1	
Ring Ouzel	*Turdus torquatus*	LC	2, 6, 7	1	
Mistle Thrush	*Turdus viscivorus*	LC	1, 2, 3, 6	1	
Dwarf Bulrush	*Typha minima*	LC	5	2	
Common Barn Owl	*Tyto alba*	LC	1, 2, 3,6	2	
A beetle	*Uloma rufa*	Not evaluated	7	1	
Thick Shelled River Mussel	*Unio crassus*	VU	5	3	
Hoopoe	*Upupa epops*	LC	1, 2, 3, 6	1	
Brown Bear	*Ursus arctos*	LC	7	5	HD 2;4
Northern Lapwing	*Vanellus vanellus*	NT	5	2	
Particoloured Bat	*Vespertilio murinus*	LC	2, 1, 3, 6, 7	3	HD 4
Horned Viper	*Vipera ammodytes*	LC	3, 6, 7, 2, 1	3	HD 4
Adder	*Vipera berus*	LC	3, 4, 6	2	
Streber	*Zingel streber*	LC	5	3	DH 2
Common Zingel	*Zingel zingel*	LC	5	2	

Appendix 12.2: Natural Critical Habitat and Priority Biodiversity Features Assessment

EBRD Criteria for Critical Habitat

PR6 (paragraph 14) addresses the areas identified as critical habitat that hold the highest tier of irreplaceable (existing in few places) and vulnerable (at high risk of being lost) biodiversity features. The criteria used by the EBRD's PR6 to define critical habitat build on and are closely aligned with those used by the International Finance Corporation Performance Standard 6 (IFC PS6). PR6 also explicitly includes ecological functions that are vital for maintaining the viability of critical habitat features. Illustrative examples of such functions, as well as examples of features that would meet other critical habitat criteria, are provided in Table 12.2 Examples of features that may meet criteria for critical habitat and relationship with criteria for priority biodiversity features.

All species which were awarded a value of 4 or 5 at the valuation stage or are listed as vulnerable or endangered according to the IUCN were listed as Priority Biodiversity Features.

Habitats were scoped into the assessment at the habitat valuation stage, these are then screened below for the inclusion as critical habitats that potentially require offsetting. The critical habitat screening is presented in Table 12..

Table 12.2 Examples of features that may meet criteria for critical habitat and relationship with criteria for priority biodiversity features

Critical habitat	Definition/examples	Priority Biodiversity Feature
(i) Highly threatened or unique ecosystems	Ecosystems that are at risk of significantly decreasing in area or quality; have a small spatial extent; and/or contain concentrations of biome- restricted species. For example: • Ecosystems listed as, or meeting criteria for, Endangered or Critically Endangered by the IUCN Red List of Ecosystems • Areas recognised as priorities in official regional or national plans, such as National Biodiversity Strategy and Action Plans • Areas determined to be of high priority/significance based on systematic conservation planning carried out by government • bodies, recognised academic institutions and/or other relevant qualified organisations (including internationally-recognised NGOs).	(i) Threatened habitats
(ii) Habitats of significant importance to endangered or critically endangered species	Areas supporting species at high risk of extinction (Critically Endangered or Endangered) on the IUCN Red List of Threatened species (or equivalent national/regional systems). For example: • Alliance for Zero Extinction sites • Animal and plant species of community interest in need of strict protection as listed in EU Habitats Directive (Annex IV).	(ii) Vulnerable species
(iii) Habitats of significant	Areas holding a significant proportion of the global range or population of	(iii) Significant biodiversity features

Critical habitat	Definition/examples	Priority Biodiversity Feature
importance to endemic or geographically restricted species	species qualifying as restricted-range under Birdlife or IUCN criteria. For example: • Alliance for Zero Extinction sites • Global-level Key Biodiversity Areas and Important Bird and Biodiversity Areas identified for restricted-range species.	identified by a broad set of stakeholders or governments (such as Key Biodiversity Areas or Important Bird Areas)
(iv) Habitats supporting globally significant (concentrations of) migratory or congregatory species	Areas that support a significant proportion of a species' population, where that species cyclically and predictably moves from one geographical area to another (including within the same ecosystem), or areas that support large groups of a species' population that gather on a cyclical or otherwise regular and/or predictable basis. For example: • Global-level Key Biodiversity Areas and Important Bird and Biodiversity Areas identified for congregatory species • Wetlands of International Importance designated under criteria 5 or 6 of the Ramsar Convention.	
(v) Areas associated with key evolutionary processes	Areas with landscape features that might be associated with particular evolutionary processes or populations of species that are especially distinct and may be of special conservation concern given their distinct evolutionary history. For example: • Isolated lakes or mountaintops • Populations of species listed as priorities by the Edge of Existence programme.	
(vi) Ecological functions that are vital to maintaining the viability of biodiversity features described (as critical habitat features)	Ecological functions without which critical biodiversity features could not persist. For example: • Where essential for critical biodiversity features, riparian zones and rivers, dispersal or migration corridors, hydrological regimes, • seasonal refuges or food sources, keystone or habitat-forming species.	(iv) Ecological structure and functions needed to maintain the viability of priority biodiversity features

Table 12.3 – Critical Habitat Screening Table.

1. Highly threatened or unique ecosystems.
2. Habitats of significant importance to endangered or critically endangered species
3. Habitats of significant importance to endemic or geographically restricted species, or species qualifying as restricted-range under Birdlife or IUCN criteria
4. Habitats supporting globally significant (concentrations of) migratory or congregatory species.
5. Areas associated with key evolutionary processes.
6. Ecological functions that are vital to maintaining the viability of biodiversity features described (as critical habitat features). E

Receptor / baseline information					Assessment (see definitions above)						Result			Outcome		
Habitat English	Habitat Romanian	Discrete Management Unit[1] (area and location)	Baseline Data[2]	Conservation Status[3]	1	2.	3.	4.	5	6.	Critical Habitat (CH)?	Potential Significant effect?	Priority Biodiversity Feature?	Mitigation Required?	Any significant effects following mitigation	Offsetting required
Agro ecosystems (B1)																
All	N/A	In sections throughout BRUA - 763ha in total to be directly impacted	Mapped within EIA	N/A – no specific status	No	No	No	No	No	Has some importance for species such as foraging bats but not considered critical habitat.	No	No	No	General mitigation will mitigate all foreseen impacts	No	No
Anthropic areas (B2)																
All	N/A	In sections throughout BRUA – 35.9ha of data in total to be directly impacted	Mapped within EIA	N/A – no specific status	No	No	No	No	No	No	No	No	No	General mitigation will mitigate all foreseen impacts	No	No
Grasslands (B3)																
Pastures	N/A	All along BRUA route Total of 122.68ha along BRUA route to be impacted (not broken down into grassland type)	N/A no specific mapping	N/A	No	No	No	No	No	Can have some importance for notable species such as Steppe Grasshopper (*Isophya costata*), Bush Grasshopper (*Isophya stysi*), European ground squirrel (*Spermophilus citellus)* and reptile species but not considered a critical habitat.	No	No	No	General mitigation will mitigate all foreseen impacts	No	No
Hay meadows	N/A	All along BRUA route	N/A no specific mapping	N/A	No	No	No	No	No	Can have some importance for notable species such as Steppe	No	No	No	General mitigation will mitigate all foreseen impacts	No	No

Receptor / baseline information					Assessment (see definitions above)						Result			Outcome		
Habitat English	Habitat Romanian	Discrete Management Unit[1] (area and location)	Baseline Data[2]	Conservation Status[3]	1	2.	3.	4.	5	6.	Critical Habitat (CH)?	Potential Significant effect?	Priority Biodiversity Feature?	Mitigation Required?	Any significant effects following mitigation	Offsetting required
										Grasshopper (*Isophya costata*) Bush Grasshopper (*Isophya stysi*), Balkan mole rat (*Spalax graecus*) but not considered critical habitat.						
Mountain meadows and upland grasslands within Natura 2000 sites	6520 Fânețe montane 6170 Pajiști calcifile alpine şi subalpine	ROSCI0129 Nordul Gorjului de Vest	EIA and AA record this habitat within the BRUA route within ROSCI0129 and ROSCI0292	Habitat listed within designation for Natura 2000 site	No	Yes – may support Danube Clouded Yellow (*Colias myrmidone*).	No	No	No	Yes - Important for a range of species including Steppe iris (*Iris aphylla ssp. Hungarica*), Carpathian tozzia (Tozzia carpathica) and Alpine shrew (*Sorex alpinus*).	Yes	Yes	Yes	Yes - specific mitigation required and specified in the Mitigation tables	Yes in the Short-term no in the Mid to Long-term if re-establishment of target habitat is successful	Yes - mitigation in terms of Short-terms effects and due to any uncertainty over areas of habitat to be affected and mitigation success. TBC in offsetting strategy
Other grassland habitats within Natura 2000 sites. Communities of tall grass from the lowlands up to mountain and alpine	6430 Comunități de lizieră cu ierburi înalte higrofile de la nivelul câmpiilor, până la cel montan și alpin	ROSCI0129 Nordul Gorjului de Vest	No specific data on location, confirmed as present along BRUA route	Habitat listed within designation for Natura 2000 site	No	No	No	No	No	Yes – may support Danube Clouded Yellow (*Colias myrmidone*)	Yes	Yes - Direct impacts to this habitat are likely. This habitat is also important for a range of species including Steppe iris (Iris aphylla ssp. Hungarica) and Carpathian tozzia (Tozzia carpathica).	Yes	Yes - specific mitigation required and specified in the Mitigation tables	Yes in the Short-term no in the Mid to Long-term if re-establishment of target habitat is successful	Yes - mitigation in terms of Short-terms effects and due to any uncertainty over areas of habitat to be affected and mitigation success. TBC in offsetting strategy
Eroded Terrains																
All	N/A	3.14ha of this habitat recorded along the BRUA route	Location of these habitats mapped within the EIA section appendix	N/A	No	No	No	No	No	No	No	No	No	N/A	N/A – if appropriate erosion control techniques are applied in line with Good Practice mitigation there is the potential for an	N/A

Receptor / baseline information					Assessment (see definitions above)						Result			Outcome		
Habitat English	Habitat Romanian	Discrete Management Unit[1] (area and location)	Baseline Data[2]	Conservation Status[3]	1	2.	3.	4.	5	6.	Critical Habitat (CH)?	Potential Significant effect?	Priority Biodiversity Feature?	Mitigation Required?	Any significant effects following mitigation	Offsetting required
															improvement in the ecological condition of these habitats.	
Riparian habitats																
Significant (in area) riparian areas within Natura 2000 sites	N/A – no riparian habitats to be impacted within SAC / SCI – some habitats within SAC may be impacted (these habitats do not have classification numbers).	Two river crossings within SPA's - ROSPA0106 Valea Oltului Inferior and ROSCI0385 Râul Timis între Rusca şi Prisaca	Crossing locations known (via directional drilling)	Habitats within Natura 2000 site	No	No	No	No	No	Yes, birds including Eurasian Oystercatcher *Hematopus ostralegus* and reptiles including Hermann's Tortoise *Testudo hermanni*	Yes	Yes	Yes	GIP mitigation will be complied with and river crossings to will be directionally drilled under a specific method statement. Bespoke mitigation for species will also need to be followed. Impacts post mitigation are not considered significant, considering that these crossings are to be directionally drilled.	Considered unlikely.	Yes – if No net loss cannot be achieved in-situ.
Riparian areas (Artificial)	N/A	265 artificial watercourses are crossed by BRUA	No specific baseline data on these water courses was available	N/A	No	No	No	No	No	No	No	No	No	General Mitigation	No	No
River crossings – Natural (excluding those within Natura 2000 sites)	N/A	121 natural water courses are crossed by BRUA. 12 of these are crossed through directional drilling. Study of aerial mapping has identified further crossings which should be	No specific baseline data regarding these water courses was available.	N/A	No	No	No	No	No	No	No	Yes – The riparian areas throughout the route have the potential to support species such as Otter (*Lutra lutra*), Carpathian Brook Lamprey	Some of the river crossings along the route may qualify as PBF. This will need to be confirmed through specific	GIP and habitat and species specific mitigation	Yes	Yes – if No net loss cannot be achieved in-situ.

Receptor / baseline information					Assessment (see definitions above)						Result			Outcome		
Habitat English	Habitat Romanian	Discrete Management Unit[1] (area and location)	Baseline Data[2]	Conservation Status[3]	1	2.	3.	4.	5	6.	Critical Habitat (CH)?	Potential Significant effect?	Priority Biodiversity Feature?	Mitigation Required?	Any significant effects following mitigation	Offsetting required
		investigated further prior to works commencing to determine if directional drilling or specific mitigation should be applied to limit environmental impacts. These are shown on Figure 5. The biodiversity specialist should identify any sensitive river crossings and if these qualify as CH or PBF. The biodiversity specialist should determine if a specific management plan is required for each natural crossing.										(*Eudontomyzon danfordi*) Danubian Brook Lamprey (Eudontomyzon vladykovi)	surveys ahead of the works.			
Flooded areas / small wetlands	N/A	Two key flooded areas have been identified from Aerial mapping A wetland located south of Strámbeni (in the Posidor – Corbu sector); A wetland located north of Poeni (in the Posidor – Corbu sector.	Detailed mapping of water bodies is not available.	N/A	No	No	No	No	No	Yes, may support species such as Otter (*Lutra lutra*) and notable bird species.	No	No – These areas are likely to qualify as PBF.	These features are likely to qualify as priority biodiversity features.	Yes – mapping / assessment ahead of the works. Appliacation of avoidance or bespoke mitigation as required. Avoiding sensitive periods or directionally drilling beneath these features	Yes in the Short-term no in the Mid to Long-term if re-establishment of target habitat is successful	Yes - mitigation in terms of Short-terms effects and due to any uncertainty over areas of habitat to be affected and mitigation success. TBC in the offsetting strategy.
Bushes / scrub / shrubs / heath (B6)																
Boreal and alpine heath	4060 Tufărișuri alpine și boreale	Within ROSCI0129 Nordul Gorjului de Vest	Recorded along the BRUA route when specific surveys conducted for the EIA	Annex 1 Habitat listed within designation for Natura 2000 site	No	No	No	No	No	Yes – this habitat may support notable bird and mammal species.	Yes	Yes	Yes	Yes – see specific mitigation	Yes in the Short-term no in the Mid to Long-term if re-establishment of target habitat is successful.	Yes to achieve no net loss - mitigation in terms of Short-terms effects and due to any

Receptor / baseline information					Assessment (see definitions above)						Result			Outcome		
Habitat English	Habitat Romanian	Discrete Management Unit[1] (area and location)	Baseline Data[2]	Conservation Status[3]	1	2.	3.	4.	5	6.	Critical Habitat (CH)?	Potential Significant effect?	Priority Biodiversity Feature?	Mitigation Required?	Any significant effects following mitigation	Offsetting required
																uncertainty over areas of habitat to be affected and mitigation success.
Bushes, scrub and shrub outside of Natura 2000 areas	N/A	Located throughout BRUA route, 13.86ha of this habitat to be impacted.	Detailed mapping is not available.	N/A	No	No	No	No	No	Yes – can support notable species such as nesting birds.	No	No	No	General Mitigation	No	No
Forests (B7)		A total of 97.95ha of forest are to be removed to facilitate the works.														
Forests within Natura 2000 sites	-9110 Păduri de fag de tip Luzulo-Fagetum -9130 Păduri de fag de tip Asperulo-Fagetum -9150 Păduri medio-europene de fag din Cephalanthero-Fagion pe substrate calcaroase -9170 Păduri de stejar cu carpen de tip Galio-Carpinetum -91L0 Păduri ilirice de stejar cu carpen (Erythronio-Carpinion) -91M0 Paduri balcano-panonice de cer si gorun -91M0 Păduri balcano-panonice de cer şi gorun -91V0 Păduri dacice de fag	Located within Natura sites: ROSCI0138 Pădurea Bolintin ROSCI0129 Nordul Gorjului de Vest ROSCI0292 Coridorul Rusca Montană - Ţarcu - Retezat ROSCI0236 Strei Haţeg	Presence of these habitats along the BRUA pipeline is confirmed within the EIA and AA. Exact locations are not mapped.	Annex 1 Habitat listed within designation for Natura 2000 site	No	No	No	No	No	Yes – Important habitat for a range of species including Brown bear (*Ursus arctos*), Red footed falcon (*Falco vespertinus*), roosting bats, and invertebrates such as Hermit Beetle (*Osmoderma eremita*).	Yes	Yes, both fragmentation of these habitats and permanent loss / conversion of these habitats.	Yes	General mitigation, habitat specific mitigation and species specific mitigation	Yes in the Short and Mid-term there will be fragmentation and habitat loss due to the time the woodland will require to fully mature. In the Long-term loss and conversion of the habitat.	Yes – see offsetting section in Chapter 12.

Receptor / baseline information					Assessment (see definitions above)						Result			Outcome		
Habitat English	Habitat Romanian	Discrete Management Unit[1] (area and location)	Baseline Data[2]	Conservation Status[3]	1	2.	3.	4.	5	6.	Critical Habitat (CH)?	Potential Significant effect?	Priority Biodiversity Feature?	Mitigation Required?	Any significant effects following mitigation	Offsetting required
	(Symphyto-Fagion) -91V0 Păduri dacice de fag (Symphyto-Fagion) -91Y0 Paduri dacice de stejar si carpen 9410 Păduri acidofile de molid (Picea) din etajul montan până în cel alpin (Vaccinio-Piceetea)															
Semi natural forests	There may be woodlands of quality outwith the Natura 2000 sites	Not accurately mapped	A number of woodlands are present along the route. The specific details of each of the woodlands in not accurately mapped at this time.	There may be Annex 1 quality forests outwith the designation for Natura 2000 site	No	No	No	No	No	Yes – Important habitat for a range of species including Brown bear (*Ursus arctos*), Red footed falcon (*Falco vespertinus*), roosting bats, and invertebrates such as Hermit Beetle (*Osmoderma eremita*)	Yes – some of the semi natural forests are likely to qualify as Critical Habitats.	Yes	Some of the forests along the route will qualify as priority biodiversity features.	Ahead of works forest species makeup will need to be surveyed and mapped. General mitigation - and species specific mitigation	Yes in the Short and Mid-term there will be fragmentation and habitat loss due to the time the woodland will require to fully mature.	Yes – see offsetting in Chapter 12.
Plantation forests	N/A	Not accurately mapped.	A number of woodlands are present along the route. The specific details of each of the woodlands in not accurately mapped at this time.	N/A	No	No	No	No	No	Can support species identified as PBF	No	No	No	Yes – general mitigation	No	No
Other																

Receptor / baseline information					Assessment (see definitions above)						Result			Outcome		
Habitat English	Habitat Romanian	Discrete Management Unit[1] (area and location)	Baseline Data[2]	Conservation Status[3]	1	2.	3.	4.	5	6.	Critical Habitat (CH)?	Potential Significant effect?	Priority Biodiversity Feature?	Mitigation Required?	Any significant effects following mitigation	Offsetting required
Transitional communities	N/A	Not mapped (largely too small to map)	No specific baseline data obtained to date	N/A	No	No	No	No	No	These habitats may support some notable species but are not considered PBF.	No	No	No	General mitigation	No	No
Scree limestone and calcareous shale from the mountain to the alpine (*Thlaspietea rotundifolii*)	*8120 Grohotişuri calcaroase şi de şisturi calcaroase din etajul montan până în cel alpin (Thlaspietea rotundifolii*	Located within ROSCI0129 Nordul Gorjului de Vest	Identified along the BRUA route within the EIA and AA	Annex 1 Habitat listed within designation for Natura 2000 site	No	No	No	No	No	Yes – may support notable fern species assemblages.	Yes	Yes	Yes	Yes – see general and specific mitigation	Yes there will be impacts in the Short term no in the Mid to Long-term if re-establishment of target habitat is succesful	Yes to offset impacts in the Short term – see Chapter 12.
Ponds and ephemeral water bodies	N/A	Not mapped, likely to be present at low density along the route.	No specific baseline data obtained to date, features too small to map	N/A	No	No	No	No	No	These habitats may support a range of notable species including Fire-Bellied Toad (*Bombina bombina*) Yellow-Bellied Toad (*Bombina variegate*)	Yes – some of these features will likely qualify as CH.	No	Some ponds along the route are likely to qualify as PBF.	Yes – surveys ahead of the works to confirm status of ponds and map them. Any impacted ponds will be replaced lik-for-like. There will also be additional ponds created along the route.	Yes there will be impacts in the Short term no in the Mid to Long-term if re-establishment of target habitat is succesful	Yes to offset impacts in the Short term see Chapter 12.

Appendix 12.3: Impact Assessment Tables

Table 12.4 – Biodiversity Mitigation Screening Table.

	Determination of Potential Impacts	Pre-mitigation Impacts						Consideration of Mitigation Measures		Post Mitigation Impacts		
Receptor	**Potential Impact**	**Adverse/ Beneficial**	**Direct/Indirect**	**Reversibility**	**Magnitude (average of a 1 – 5 scale of Severity, Spatial Extent and Duration**	**Likelihood**	**Significance**	**Mitigation Measures (Summary - full details in mitigation tables)**	**Identification of Residual Impact Considering Mitigation Measure**	**Magnitude**	**Likelihood**	**Significance**
Ecology												
Habitat Loss and Degradation (Direct) Natura 2000 Nature Conservation Sites (SAC, SCI, SPA).	Habitat Loss and Degradation (Direct) Nature of Impact Construction Direct impacts will occur to the following sites ROSCI0138 Pădurea Bolintin crossed on a length of 2.0 km; ROSPA0106 Valea Oltului Inferior crossed on a length of 1.3 km. ROSCI0129 Nordul Gorjului de Vest crossed on a length of 14.2 km; ROSCI0063 Defileul Jiului, crossed on a length of 0.2 km; ROSCI0236 Strei-Hateg crossed on a length of 3.5km; ROSCI0292 Coridorul Rusca Montană - Ţarcu – Retezat crossed on a length of 3.0 km; ROSCI0385 Râul Timis între Rusca şi Prisaca crossed on a length of 0.7 km; Source of Impacts – vegetation clearance for the preparation of the working corridor – Habitat removal to facilitate pipe installation	Adverse	Direct	Irreversible	High (Severity 5, Spatial Extent = 4, Duration 4= 4)	Frequent (5)	High	The following mitigation will be implemented at each site to limit impacts. General mitigation (GIP) and details of habitat specific mitigation can be seen in Chapter 12. Bespoke method statements for construction and restoration will be drawn up for each Natura Site directly impacted by the works. ROSCI0138 Pădurea Bolintin. Route of pipeline will be limited to 14m and be limited to an area already impacted by deforestation to allow a previous linear development. After pipeline installation, the affected area will be reinstated according to the methodology shown in the appropriate mitigation table. ROSPA0106 Valea Oltului Inferior. The location where the pipeline route crosses this designated site is already impacted by a road and utilities crossings. Additionally, where the pipeline is to cross the Olt river, this will be achieved through directional drilling. Where the pipeline is to be installed within grasslands adjacent to the river, this area will be remediated as shown in the appropriate mitigation table. ROSCI0129 Nordul Gorjului de Vest. Where the pipeline route crosses this designated site, the route follows a largely degraded corridor adjacent to the 664 road. Following the completion of the works, this area will be remediated as shown in the appropriate mitigation table.	The majority of habitat will be restored following construction There will be mid and Long-term residual effects. Offsetting will be required in line with Chapter 12.	Medium (Severity 3, Spatial Extent = 3, Duration 4= 3)	Frequent (5)	High will require offsetting

	– construction of camp facilities / pipe laydown areas etc. – vehicles causing soil compaction and erosion – dust produced by vehicles causing reducing the fitness of plants and therefore habitats – laying of temporary roads <u>Operation</u> The operation of the pipeline itself is not considered likely to have an impact upon the Natura 2000 sites. However, the Rights of Way maintenance will require a permanent 6m zone of clearance to be maintained.							ROSCI0063 Defileul Jiului. Although the pipeline crosses into this designated site, the crossing is a minor incursion on the periphery of the site which supports meadow. No significant impact to this site is foreseen. All impacts to habitats within this site will be remediated according to habitat specific mitigation. ROSCI0236 Strei-Hateg. The pipeline route crosses this designated site at the periphery. Where the pipeline route is proposed, the habitat of this designated site is predominantly agriculture. Some small areas of forest will need to be removed to facilitate the works. All areas impacted by the works will be remediated according to the mitigation outlined in the habitat specific mitigation. ROSCI0292 Coridorul Rusca Montană - Ţarcu – Retezat. Where this site is crossed the proposed pipeline route follows a degraded area adjacent to the 68 road already impacted by linear developments. Some forests will be impacted, all areas impacted by the works will be remediated according to the mitigation outlined in the habitat specific mitigation. ROSCI0385 Râul Timis între Rusca şi Prisaca; The riparian habitats within this designated site will not be impacted as this river is to be crossed via directional drilling (as stated in the EIA). Impacts to the other habitats within this site will be remediated following the appropriate mitigation table. Once the above mitigation is implemented, there will be residual impacts resulting from habitat loss. This will need to be offset, details of proposed offsetting is presented in Chapter 12. <u>Operation</u> The Rights of Way maintenance will require a permanent 6m zone of clearance which is a residual effect. Teams conducting this maintenance must be accompanied by an Biodiversity Specialist who will advise upon any sensitive areas and any remediation required. Vegetation removal within Natura 2000 sites must be conducted				

								outside of March – August inclusive or a check for nesting birds must be conducted immediately prior to works commencing.				

Potential for the DIRECT fragmentation of the following Natura 2000 sites Nature Conservation Sites including the Priority Biodiversity Features (SAC, SCI, SPA).	Potential for the DIRECT fragmentation of the following Natura 2000 site Construction Nature of Impact ROSCI0138 – Pădurea Bolintin Direct habitat removal within this forest will occur in order to facilitate the installation of the route. ROSPA0106 Valea Oltului Inferior Some fragmentation of this SPA may result from the works. ROSCI0129 Nordul Gorjului de Vest– some direct fragmentation of this SCI will occur as a result of the works. ROSCI0236 Strei-Hateg – There is direct fragmentation of this SCI resulting from the works. ROSCI0292 Rusca Montana-Tarcu-Retezat – this Site is directly fragmented by the BRUA route. ROSCI0385 Râul Timis între Rusca şi Prisaca will be directly fragmented by the BRUA pipline. Wider fragmentation of Natura 2000 sites (see Figure XXXX). Beyond the fragmentation of ROSCI0129 Nordul Gorjului de Vest There is also wider potential for fragmentation effects resulting from the works, between ROSCI0129 Nordul Gorjului de Vest and habitats/designated sites to the north east (ROSCI0063 and XXXXX) and to the south west (ROSCI0198 - **Platoul Mehedinti).** **The fragmentation effect could be particularly apparent to mobile species such as bears, wolves and other ground mammals which utilize this**	Adverse	Direct	Reversible	High (Severity 4, Spatial Extent = 4, Duration 4= 4)	Frequent (5)	High	Bespoke method statements for construction and restoration will be drawn up for each Natura Site directly impacted by the works. During construction, direct fragmentation of forest habitats within Natura 2000 sites will be minimised by: Limiting night time working during sensitive periods; Staggering works to ensure that entire blocks of forest are not severed, to allow mobile terrestrial species to move through these corridors; Limiting spatial extent of works within forests – a 14m working width will be used; Details of the mitigation proposed are presented in Chapter 12. Once construction is complete, operational fragmentation will be minimized through replanting of the affected areas as stated in Chapter 12.	In areas of woodland newly fragmented offsetting will be required. See Chapter 12.	Low High (Severity 3, Spatial Extent = 2, Duration 2= 2)	Frequent (5)	Medium will require offsetting

	corridor for movement through the wider landscape. Beyond the route crossing through ROSCI0236 Strei-Hateg –there is the potential for further fragmentation effects. Works in this area have the potential to fragment habitat connectivity to natura 2000 sites, for example between ROSCI0087 / ROSPA0045 Grădiştea Munc elului - Cic lovina to the north-east and ROSPA0084 **Munţii Retezat to the south-west.** Beyond the location of the crossing of site ROSCI0292 Rusca Montana-Tarcu-Retezat there is the potential for wider fragmentation of Natura 2000 sites, such as ROSCI021 Rusca Montană to the north, and ROSCI0052 Dăncioanea to the south. This fragmentation effect would have the highest impact upon terrestrial mammals which move through these habitats (such as bears). <u>Operation</u> The operation of the pipeline itself is not considered likely to have an impact upon the Natura 2000 sites. However, the Rights of Way maintenance will require a permanent 6m zone of clearance to be maintained.											

Habitat degradation – indirect Natura 2000 Conservation Sites (SAC, SCI, SPA).	Habitat degradation – indirect Construction Nature of Impact In addition to the direct habitat loss and fragmentation of Natura 2000 sites, there is potential for indirect impacts from noise, reduction in air quality and disturbance (including visual disturbance). The following sites are within 5km of the proposed works and could experience indirect impacts: ROSCI0138 Pădurea Bolintin (BRUA crosses this site) ROSPA0106 Valea Oltului Inferior Valley (BRUA crosses this site) ROSCI0296 Dealurile Drăgăşaniului ROSCI0045 Coridorul Jiului ROSCI0129 Nordul Gorjului de Vest (BRUA crosses this site) ROSCI0063 Defileul Jiului (BRUA crosses this site); ROSCI0236 Strei-Hateg (BRUA crosses this site) ROSCI0292 Rusca Montana-Tarcu-Retezat (BRUA crosses this site) ROSCI0126 Munţii Ţarcu ROSCI0219 Rusca Montană ROSCI0385 Râul Timis între Rusca şi Prisaca (BRUA crosses this site) ROSCI0109 Lunca Timişului Operation The operation of the pipeline itself is not considered likely to have an	Adverse	Indirect	Reversible	Low (Severity 2, Spatial Extent = 2, Duration 2= 2)	Frequent (5)	Medium	Construction Construction impacts will be mitigated through a range of general mitigation measures and bespoke mitigation where required. General mitigation measures are presented in Chapter 12. Operation Teams conducting operational maintenance must be accompanied by an Biodiversity Specialist who will advise upon any sensitive areas and any remediation required.	Demarcation of working corridors and Supervision by Biodiversity Specialists will result in no Long-term residual effect	Low (Severity 2, Spatial Extent = 2, Duration 2= 2)	Rare (1)	Low

	impact upon the Natura 2000 sites. The operation of the 3 compressor stations is unlikely to have an impact upon any Natura 2000 sites as the closest is over 500m from a Natura 2000 site (ROSCI0138 Pădurea Bolintin) and the operational noise and visual disturbance of the operation of this facility is considered unlikely to have a significant impact upon the notable features of the site. However, the Rights of Way maintenance will require a permanent 6m zone of clearance to be maintained.											

Habitat loss – Sensitive habitats not within Natura 2000 sites **Highly Sensitive habitats are:** Natural Riparian Habitats at river crossings along the route Semi natural Forests Notable grasslands and meadow habitats Ponds / ephemeral water bodies **Moderately sensitive habitats are:** Plantation woodland and scrub Habitats Some grassland habitats **Less sensitive habitats are:** Agriculture and built up areas (road etc.).	Habitat loss – Sensitive habitats not within Natura 2000 sites Construction Nature of Impact Habitat loss due to the required pipeline laydown area and small amounts of habitat will be removed in the construction of temporary roads, compounds and for access. Additionally there is potential for numerous adjacent habitats to be significantly degraded due to compaction, erosion and dust which could result on the habitats being permanently damaged also indirectly affecting fauna and ecosystem services. Source of Impact – vegetation clearance for the preparation of the working corridor – Habitat removal to excavate pipe trenches – construction of compound facilities / pipe laydown areas etc. – vehicles causing soil compaction and erosion – dust produced by vehicles causing reducing the fitness of plants and therefore habitats – laying of temporary roads Operation The operation of the pipeline itself is not considered likely to have an impact. However, the Rights of Way maintenance will require a permanent 6m zone of clearance to be maintained.	Adverse	Direct	Irreversible	High (4) (Severity 4, Spatial Extent = 1, Duration 4 = 3)	Frequent (5)	High	Where possible the BRUA route has been modified to avoid sensitive habitats. Ahead of all works sensitive habitats will be mapped in detail by a Biodiversity Specialist so that specific mitigation can be planned and any necessary pre works actions can be taken (flora and fauna translocations, turf cutting). For details of sensitive habitats and these specific actions please see Chapter 12 and the BMP. After construction is complete, impacted habitats will be restored according to the prescriptions in Chapter 12. Tool box talks to inform contractors of local sensitivities including presence of notable and protected species and SPA / SCI / SAC. Implement the Transgaz Health, Safety, Security, Environment and Social Performance (HSSE & SP) Control Framework for: – Biodiversity – Soil and Ground Water – Water in the Environment – Specification for Discharge to Water A will be present on works sites at all times and will monitor the site regularly providing regular reports on compliance. All works in sensitive habitats will follow specific mitigation according to a method statement where appropriate. There will be no construction of site compounds in sensitive habitats. Removal of any top spoil or habitat will be reinstated according the relevant mitigation guidelines. Where trees are removed, these will be replanted as specified in the appropriate mitigation table. Vehicles will be restricted to demarcated working corridors.	There will be Short-term habitat disruption, however with suitable mitigation and compensation (offsetting), residual impacts will be limited.	Low Non-woodland (Severity 1, Spatial Extent = 1, Duration 2 = 1 Medium Woodland (Severity 3, Spatial Extent = 1, Duration 5 = 3	Non-woodland Infrequent (2) Woodland Frequent (5)	Non-woodland Low / Woodland High some areas will require offsetting

								Vehicles will be restricted to a pre agreed speed limit to minimize dust Monitoring of re-instated habitats for a minimum of 36 months. <u>Operation</u> The Rights of Way maintenance will require a permanent 6m zone of clearance which is a residual effect but unlikely to be significant in the majority of woodlands. Teams conducting this maintenance must be accompanied by an Biodiversity Specialist who will advise upon any sensitive areas and any remediation required.				

Habitat pollution **Sensitive habitats are** Nature Conservation Sites including Natura 2000 sites Riparian habitats and associated water courses Ponds and other waterbodies along the BRUA route. **Moderately sensitive habitats are:** Semi natural woodlands and grasslands, scrub areas. **Less sensitive habitats are:** Agriculture and built up areas (road etc.).	Habitat pollution Construction Nature of Impact The will be numerous sources of potential pollution to both terrestrial and aquatic habitats, this pollution could cause indirect mortality, prevent successful faunal breeding, reduction in food sources and cause persistent water, air and land quality deterioration. Source of Impact -storage of materials and machinery that may leak oil -use of power tools / plant and generators -production of dry and wet waste from human encampments -accidental spillage -sediment pollution of watercourses with topsoil runoff. -Litter and other general waste from workers. -Pollution from directional drilling waste -Dust from power tools and roads (also addressed in air quality impacts). Operation The operation of the pipeline itself is not considered likely to have an impact.	Adverse	Direct	Reversible	Moderate (Severity 4, Spatial Extent = 1, Duration 4 = 3)	Frequent (5)	High	Further details of the pollution control measures are provided in the General Mitigation table in Chapter 12 and other sections of this SEIA. Strict pollution prevention guidelines will be adhered to as outlined in the EIA and permitting documents such as the use of silt fences, coffer damns for in trench working in areas of high flow. The waste management plan will be produced and followed at all times. Tool box talks to inform contractors of local sensitivities. A Biodiversity Specialist will be present on site at all times and will monitor the site regularly providing weekly reports on compliance. They will implement additional mitigation such as turbidity monitoring if required. There will be no storage of materials that may accidently cause pollution within 20m of a watercourse or wetland. Emergency spill kits (in line with industry standards) will be available at all times. Wastewater discharge will be made according to NTPA001[1] -when discharging into natural water bodies. Soakaways and wheel washes will be located in areas that are the least sensitive. All sewage will be controlled according to the prescriptions in the EIA. Operation Grassy polders will be installed around functional sites (compressor stations etc.) associated to the operational phase. Such structures will absorb the rainwater from these sites, retaining most of the particles in suspension and preventing discharge of any chemicals from the site into the environment.	With the exception of exceptional accidents one would expect that strict adherence to pollution prevention measures and waste management would result in no significant effect from pollution.	Very Low (Severity 1 Spatial Extent = 1, Duration 1 = 1	Occasional (3)	Low

[1] As defined in the Norms on pollutant loading limits of industrial wastewater and natural receptors NTPA001 / 2002

<u>Spread of non-native invasive species</u> **Sensitive Habitats:** All areas within Natura 2000 sites Riparian Corridors Woodlands: Areas of highest risk are adjacent to stands of Acacia, woodland, areas which could be colonized by bracken (*Pteridium aquilinum*) (particularly within ROSCI0236 Strei-Haţeg). **Other Areas** All habitats are at risk from spreading invasive species, particularly those adjacent to habitats already containing Japanese knotweed (*Fallopia japonica*) and (*Helianthus tuberosus*).	<u>Spread of non-native invasive species</u> <u>Construction</u> <u>Nature of Impact</u> Invasive species have been recorded within the BRUA corridor, particularly Acacia and Bracken within woodlands. Within disturbed habitats and adjacent to transport corridors, (*Fallopia japonica*) and Helianthus tuberosus are prevalent. Source of Impacts: – Inappropriate control of existing stands of invasive species. – Movement of vehicles around the site – Movement of personnel around the site – Movement of soil around the site – Use of equipment throughout the site – Influx of large number of people and equipment <u>Operation</u> There is the potential to spread non-native invasive species during the maintenance of the Rights of Way.	Adverse	Direct	Reversible	Medium (Severity 2, Spatial Extent = 2, Duration = 4 = 3)	Frequent (4)	High	<u>Ahead of enabling works:</u> A suitably qualified ecologist will map and demark all areas of invasive species to be controlled. For each invasive species to be controlled a specific method statement for avoidance and management of these species will be drawn up according to the mitigation outlined in Chapter 12. These control measures may require removal of the species as a controlled waste. <u>During Construction:</u> Tool box talks to inform contractors of local sensitivities A Biodiversity Specialist will be present on site at all times and will monitor the site regularly providing weekly reports on compliance Washdown of all vehicles and equipment before entering the site Washdown of all vehicles and equipment when transferring from one habitat type to another. A site wide ban on international workers bringing vegetation or soil from outside the site. <u>After completion of the construction</u>: Areas impacted by the BRUA installation will be monitored for the presence of invasive species and remedial measures will be enacted as required. <u>Operation</u> Teams conducting this maintenance must be accompanied by an Biodiversity Specialist who will advise upon any sensitive areas and any remediation required including the removal of non-native invasive species.	These measures should successfully prevent the spread of non-native invasive species and may have a positive impact upon the Biodiversity of the affected habitats.	Medium (Severity 2, Spatial Extent = 2, Duration = 4 = 3)	Rare (1)	Low

Hydrological Disruption **Sensitive habitats are:** Natura sites (sites supporting aquatic habitats ROSPA0106 - Valea Oltului Inferior ROSCI0385 - Râul Timis între Rusca şi Prisaca Marshland and Aquatic Habitats (including Riparian Habitats and ponds, both permanent and ephemeral)	Hydrological Disruption Construction Nature of Impact Affecting the surface or ground water levels thus altering the dynamic of the hydrological systems resulting in a reduction of hydrological extents and potential future current extents. Source of Impact – Pipe testing (abstraction and discharge) – Abstraction for other processes (suppression of dust). – Abstraction for firefighting reserve; – Abstraction for general use. Operation The operation of the pipeline itself is not considered likely to have an impact.	Adverse	Indirect	Irreversible	Very High (Severity 4, Spatial Extent = 2, Duration 5= 4	Infrequent (2)	Medium	Water will only be abstracted / discharged if the appropriate permits are in place (if applicable). Water for pipe testing will be obtained from mains water resources and discharged into water facilities. Mitigation measures detailed in the water section of this SEIA must be followed. A Biodiversity Specialist will be present on site at all times in sensitive habitats and will monitor the site regularly providing weekly reports on compliance.	Monitoring required, there is considered to be no residual significant impact.	Very Low (Severity 1 Spatial Extent = 1, Duration 1 = 1	Infrequent (2)	Low

Direct Mortality *(Faunal species) present within Natura 2000 sites and other notable habitats.* *Species with the potential to be present along the route* ***include****:* ***Amphibians, notably*** *Rana dalmatina (3); Rana lessonae (3); Triturus cristatus (3); Bufo viridis (3); Hyla arborea (3); Salamandra salamandra (3); Triturus alpestris alpestris (3); Bombina bombina (4); Bombina variegata (4).* ***Bats, notably*** *Barbastella barbastellus (3); Myotis myotis (3); Miniopterus schreibersii (3); Myotis emarginatus (3); Myotis capaccinii (3); Vespertilio murinus (3); Rhinolophus euryale (4); Rhinolophus ferrumequinum (4); Rhinolophus hipposideros (4); Eptesicus serotinus (3); Myotis mystacinus (3); Nyctalus noctula (3).* ***Birds, notably:*** *Turdus iliacus (3); Anthus campestris (3); Accipiter gentilis (3); Accipiter nisus (3); Alauda arvensis (3); Anas clypeata (3); Anser anser (3); Anser erythropus (4); Anser fabalis fabalis (3); Anser fabalis rossicus (3); Asio flammeus (3); Aythia marila (3); Aythia nyroca (3); Buteo lagopus (3); Certhia brachydactyla	Direct Mortality Source of Impact – Killing from vegetation clearance – Killing during site clearance works (including destruction of nests and eggs where appropriate) – Crushing / trapping by movement of machinery / soil. – Hunting by workers – Collision with vehicles – Falling into excavations. Operation Increased mortality from hunting due to increased accessibility to the area via the BRUA Rights of Way clearance. Operation There is the potential to spread non-native invasive species during the maintenance of the Rights of Way.	Adverse	Direct	Irreversible	High (Severity 4, Spatial Extent = 4, Duration 4= 4)	Frequent (5)	High	Mitigation before and during construction This mitigation is a summary of the mitigation proposed, full mitigation is in the general mitigation tables and specific mitigation for species and habitats. Prior to all works commencing the areas to be directly impacted by the BRUA pipeline construction will be mapped in detail by a Biodiversity Specialist. This mapping will detail the potential for the presence of notable and sensitive species. This will inform the appropriate specific mitigation (Table XXX) where appropriate. In certain areas, timings of works will be limited to ensure that impacts to breeding fauna are restricted, this includes Natura sites and other areas identified by the pre-clearance surveys. All sensitive works will be supervised by a Biodiversity Specialist. Ahead of all works features likely to be impacted by the BRUA pipeline will be inspected for the presence of species. This will include: - Inspecting trees and bushes for the presence of nesting birds, including (*Falco vespertinus*) and other falcons and storks. - Inspecting cavities within trees for the presence of roosting bats and nesting mammals such as dormouse. - Searching all log piles and other places of shelter for reptiles, amphibians and mammals. - Specific mitigation measures for notable invertebrate and plant species will be employed as per Chapter 12. Tool box talks to inform contractors of local sensitivities will be conducted at the start of each day. Immediately prior to any vegetation clearance that vegetation will be	Although there may be some accidental mortality, no priority species should be significantly affected and there should be no significant Long-term effects.	Low (Severity 2 Spatial Extent = 1, Duration 2= 2)	Infrequent (2)	Low

(3); Charadrius dubius (3); Falco subbuteo (3); Falco tinunculus (3); Falco vespertinus (4); Hippolais icterina (3); Hippolais palida (3); Locustella fluviatilis (3); Locustella luscinioides (3); Lymnochryptes minimus (3); Scolopax rusticola (3); Strix aluco (3); Hematopus ostralegus (4); Aquila pomaria (3); Asio otus (3); Bubo bubo (3); Caprimulgus europaeus (3); Circus cyaneus (3); Dendrocopos leucotos (3); Lullula arborea (3). **Reptiles, notably** *Anguis fragilis (3) Coronella austriaca (3) Elaphe longissimi (3) Emys orbicularis (4) Lacerta agilis (3) Lacerta trilineata (3) Natrix tessellata (3) Vipera ammodytes (3).* **Mammals, notably** *Canis aureus (3), Cervus elaphus (3), Felis silvestris (3) Dryomys nitedula (3) Eliomys quercinus (3) Sorex alpinus (3) Spalax graecus (4) Spermophilus citellus (4).* **Invertebrtates, notably** *Cerambyx cerdo (3) Euphydryas aurinia (3) Euphydryas maturna (4) Gortyna borelii lunata (4) Isophya costata (3) Isophya stysi (3) Leptidea morsei (3) Lucanus cervus (3) Lycaena dispar (3) Maculinea teleius (4) Osmoderma eremita (4) Pholidoptera transsylvanica (3)*								searched for the presence of nests, egg laying amphibians or reptiles or mammal burrows, an offset would be applied to any areas where any breeding birds or other notable fauna were found. Vehicles will be restricted to a pre-agreed speed limit to reduce the collision risk Animal ramps into trenches to allow animals to climb out should they fall in, undertake morning checks of excavations and remove any trapped animals Staggering of works so that disturbance times are minimized. <u>Operation</u> Increased mortality during operation phase will primarily be due to an increase in hunting due to increased accessibility. Accessibility along the route of the BRUA right of way will be minimized through screening planting and the use of gates, fences and signage. The Rights of Way maintenance will require a permanent 6m zone of clearance which is not likely to effect the majority of receptors in the Long-term. Teams conducting this maintenance must be accompanied by a Biodiversity Specialist who will advise upon any sensitive areas and any remediation required. Vegetation removal within Natura 2000 sites must be conducted outside of March – August inclusive or a check for nesting birds must be conducted immediately prior to works commencing.				

Rosalia alpine (3); Carabus hungaricus (3); Cucujus cinnaberinus (3). **Plants, notably** *Campanula serrata (4) Iris aphylla ssp. Hungarica (4), Pulsatilla grandis (4) Tozzia carpathica (4).*												

Direct Mortality Fish, bivalve and crutacean species (selection of species considered most 'valuable'. *Barbus meridionalis (3)* *Sabanejewia aurata (3)* *Cobitis taenia (3)* *Leuciscus souffia (3)* *Leuciscus leuciscus (3)* *Eudontomyzon danfordi (4)* *Eudontomyzon vladykovi (4)* Aquatic crustacean species Broad-Clawed Crayfish (*Astacus astacus*) (3) *Unio Crassus*	Direct Mortality when crossing rivers Construction Nature of Impact Mortality from river crossings could result from direct killing of fish, destruction of spawn, killing from reduction in water quality from pollution or soil deposition into the watercourses. Mortality could also result from fish's inability to complete natural Lifecycle components such as moving to foraging grounds or to spawning areas. Operation The operation of the pipeline itself is not considered likely to have an impact.	Adverse	Direct	Irreversible	Low (Severity 2, Spatial Extent =2 , Duration 2= 2)	Reasonably Frequent (4)	Medium	Main rivers will be directionally drilled to remove sources of impact. Other natural rivers will be assessed prior to drilling and if considered Critical Habitat, these will be directionally drilled or suitable bespoke mitigation will be put in place to control impacts. This will be determined by the Biodiversity Specialist. All river crossing will be conducted according to the prescriptions of the water section of this SEIA. In sensitive areas work will be undertaken under a bespoke method statement and with site supervision. In rivers with the potential to support notable fish (namely fast flowing rivers with rocky bottoms and rivers within Natura 2000 sites), works will be avoided in periods of highest sensitivity namely March to September. Any fish found within cofferdams / pumped sections will be moved into the unaffected sections of the river. All riparian vegetation will be replaced in line with the prescriptions in the mitigation tables.	Some low levels of mortality are unavoidable but impacts that will affect the favorable conservation status of the identified species are not foreseen.	Low (Severity 2, Spatial Extent =2 , Duration 2= 2)	Infrequent (2)	Low

Disturbance – Noise Ground and Tree nesting breeding, passage and wintering birds, wetland birds. Breeding and hibernating reptiles. Breeding and wintering mammals.	Disturbance – Noise Nature of Impact Construction noise Construction noise is broken into two broad categories, 'everyday' noise (i.e. that which will occur all along the route) and 'noisy' work, specifically hammering to install the pipeline within hard substrates The noise relating to all of the construction will be temporary disturbance but regular to the local fauna. Numerous activities associated with pipeline laying, including lighting, personnel and equipment movement and excavation. The table within the Noise impacts section of this SEIA shows noise levels known to be associated with the works. The effect of noise on ecological receptors is an extremely complex area. For the purposes of developing practical mitigation measures Arcadis has tried to simplify this information. Deleterious effects of chronic noise exposure have been suggested to begin at levels as low as 55–60 dB(A) (Dooling & Popper 2007), though data on physiological effects are lacking. Different species do have differing noise sensitivities and responses. For the purposes of practical mitigation we have taken an average of bird responses. Auditory masking i.e. birds cannot hear each other's breeding calls auditory masking effect of continual noise depends on the pre-existing level of ambient noise. Typical ambient noise environments range from	Adverse	Direct	Reversible	Low (Severity 3, Spatial Extent = 2, Duration 2 = 2.)	Frequent (5)	Medium	Noise levels associated with the works, especially the hammering works, are sufficiently high to suggest that they would cause birds to abandon the area. As such, when working in particularly Natura 2000 sites, these works should be conducted outside of the core bird nesting season (March to August). Mobile acoustic noise barriers will be used on static equipment when undertaking the noisiest activities in sensitive areas including woodlands to minimize the nosiest works. A Biodiversity Specialist will be present in sensitive areas at all times and will monitor the site regularly providing reports on additional mitigation requirements which could involve strategic timing of works. General industry good practice must be followed at all times (do not leave machines idling when not in use etc.). Biodiversity champions will be appointed within the contractor team, these personnel will be briefed by an ecologist and will read the ESMP, they will be allocated specific monitoring and compliance duties where appropriate. Tool box talks to inform contractors of local sensitivities will be conducted. Avoidance of night-time working to minimize effects on crepuscular, nocturnal and resting fauna Staggering of works so that disturbance times are minimised Operation The Rights of Way maintenance will require a permanent 6m zone of clearance which is not likely to effect the majority of receptors in the Long-term. Teams conducting this maintenance must be accompanied by an Biodiversity Specialist who will advise upon any sensitive areas and any remediation required. Vegetation removal within Natura 2000 sites must be conducted outside of March – August inclusive or a check for nesting birds must be	There will be disturbance to foraging during the daytime although with appropriate offsetting this may not affect breeding success in the Long-term.	Low (Severity 2, Spatial Extent 1, Duration 2 = 2)	Frequent (5)	Medium but likely only to be of localised significance

	25 to 35 dB(A) in quiet rural areas, to 40 to 45 dB(A) in quiet suburban areas. Dooling and Popper (2007) concluded that, given an existing ambient noise environment of 25 to 35 dB(A) additional noise levels of noise levels of 30 to 35 dB(A) can reasonably be assumed to begin to interfere with acoustic communication. An overall noise level of 50 to 70 dB(A). Flight and abandonment response i.e. birds leave the area due to the noise At above 72.2 dB(A) flight with abandonment of the site becomes the most likely outcome of the disturbance. Wright et al. 2010 Flight and return response i.e. birds may take flight but return to the surrounding area following cessation of noise. at above 65.5 dB(A) a behavioural response of some kind becomes more likely to occur than no response. Wright et al. 2010 <u>Conclusion</u> If non-response and non-flight response were taken to be relatively harmless, and flight responses potentially costly (in terms of energy expenditure), then for those species studied at the site a costly outcome becomes more likely at = 69.9 dB(A). Lighting would also become a significant adverse effect should activities take place around dusk and dawn or at night preventing animals from their usual foraging behavior. <u>Operation</u> The operation of the pipeline itself is not considered likely to have an impact upon any of the sites including Natura 2000 sites. The operation of the 3 compressor stations is unlikely to							conducted immediately prior to works commencing.				

	have an impact upon any sites including the Natura 2000 sites as the closest is over 500m from a Natura 2000 site (ROSCI0138 Pădurea Bolintin) and the operational noise and visual disturbance of the operation of this facility is considered unlikely to have a significant impact upon fauna. However, the Rights of Way maintenance will require a permanent 6m zone of clearance to be maintained which could cause disturbance during clearance.											

Other Disturbance (i.e. not Noise) – Lighting, visual.	Construction impacts Nature of Impact Disturbance and lighting from construction activities causing visual disturbance. Lighting causing Operational Impacts The operation of the pipeline itself is not considered likely to have an impact upon the Natura 2000 sites. However, the Rights of Way maintenance will require a permanent 6m zone of clearance to be maintained which could cause visual disturbance	Adverse	Direct	Reversible	Medium (Severity 3, Spatial Extent = 3, Duration 2 = 3.)	Frequent (5)	High	Limit working width within sensitive areas (forests) to 14m. No night time working at all in Natura 2000 sites, night time working avoided in all other areas along the route. Where lighting is required it will be directional. Low UV lighting will be used to limit impacts upon bats and other insectivorous species. No access to the site by staff outside of working hours should be permitted. Operation The Rights of Way maintenance will require a permanent 6m zone of clearance. Teams conducting this maintenance must be accompanied by an Biodiversity Specialist who will advise upon any sensitive areas and any remediation required. Vegetation removal within Natura 2000 sites must be conducted outside of March – August inclusive or a check for nesting birds must be conducted immediately prior to works commencing.	Some level of disturbance is unavoidable. Measures to reduce disturbance should bring disturbance within	Medium (Severity 2, Spatial Extent = 2, Duration 2 = 2.)	Frequent (5)	Medium but likely only to be of localised significance
Impacts resulting from Air Quality Sensitive Habitats, especially those within Natura 2000 sites All species	Construction impacts For the Natura sites within the Area of Influence of the project, Nitrogen deposition is the most potentially damaging adverse effect related with air quality[2]. Threshold criteria for air quality assessment in the UK are a change of +/- 1000 vehicles per day, +/- 200 Heavy Duty Vehicles (HDV), 10kph change in daily average speed or 20kph change in peak hour speeds[3]. Vehicles for transport of materials, mostly pipe and workers, based on a comparison of the number of vehicles will be well under the threshold of the 200/day,	Adverse	Direct	Reversible	Very Low (Severity 1, Spatial Extent = 1, Duration 2 = 1.)	Frequency (i.e. when air quality will increase above critical levels) 3	Low	Dust Management Plan to be drawn up relating to the construction phase of the project which will include damping down. Monitoring of the dust volume and content emissions will be undertaken in sensitive areas such as Natura 2000 sites and wetlands.	Some low level air quality impacts are unavoidable, but considered to be below threshold limits.	Very Low (Severity 1, Spatial Extent = 1, Duration 2 = 1.)	Frequency (i.e. when air quality will increase above critical levels) 3	Low

[2] http://natura2000.eea.europa.eu/Natura2000
[3] DMRB Volume 11 Section 3, Part 1 (Highways Agency, 1993)

	Nitrogen is therefore scoped out of the assessment. PM10 emissions however have the potential to adversely affect vegetation. <u>Operational Impacts</u> The operation of the pipeline itself is not considered likely to have an impact upon any of the sites including Natura 2000 sites.											
<u>Unlikely Events</u>	<u>Construction impacts</u> <u>Nature of Impact</u> There is potential for unlikely events such as landslides, fires, lightning strikes, collapse of trenches, large scale pollution events etc. <u>Operational Impacts</u> Rupture of the pipeline	Adverse	Direct	Irreversible and Reversible	Very Large (Severity 5, Spatial Extent = 4, Duration 4 = 4.)	Frequency Rare (1)	Medium	Mitigation for unlikely events will include training of staff in: The sensitivities of the habitats and species in the area via toolbox talks from the ecologists including healthy safety recommendations regarding poisonous or otherwise dangerous plants or animals by the Biodiversity Specialists. Prevention of accidents by adhering to good practice behaviour throughout. Training in immediate response to bush fire, spillages etc. Emergency numbers provided for Biodiversity Specialists should protected species be found on site in the absence of site supervision Full time presence of Biodiversity Specialist during the daytime for the works for sensitive areas Rights of Way maintenance will minimize the likelihood of operational events.	While GIP mitigation will be employed there is always potential for extreme events outwith the projects control.	Very Large (Severity 5, Spatial Extent = 4, Duration 4 = 4.)	Frequency Rare (1)	Medium