

# Karatau 100 MW Wind Project

## Republic of Uzbekistan

Environmental & Social  
Impact Assessment

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# CONTENTS

1	INTRODUCTION	1
1.1	National Context	1
1.2	The Project	1
1.3	Scope of Document	1
1.4	Scoping Exercise Summary	3
1.5	Objectives of the ESIA Report	5
1.6	Structure of the ESIA Report	6
2	PROJECT INFORMATION	7
2.1	Key Project Information	7
2.2	Project Location	7
2.3	Land Use and Site Condition	10
2.3.1	Land Ownership	10
2.3.2	Land Use and Site Condition	10
2.4	Potential Receptor Identification	11
2.4.1	Existing Potential Receptors	11
2.4.2	Local Communities	18
2.4.3	Planned and Potential Developments	19
2.5	Project Description	21
2.5.1	Wind Turbines	21
2.5.2	Project Facilities	23
2.5.3	Operations and Maintenance Facility	24
2.6	Project Construction	24
2.6.1	Construction Activities	24
2.6.2	Laydown Areas	25
2.6.3	Construction Workforce and Accommodation	27
2.6.4	Utilities & Waste	27
2.7	Project Operation and Maintenance	28
2.7.1	Activities	28
2.7.2	Workforce	29
2.7.3	Utilities and Waste	29
2.8	Project Milestones	30
2.9	Decommissioning of the Project	30
2.10	Project Alternatives	31

2.10.1	No Project Alternative	31
2.10.2	Alternative Project Site	31
2.10.3	Project Technology	31
2.10.4	Project Layout	32
<b>3</b>	<b>REGULATORY FRAMEWORK</b>	<b>36</b>
3.1	National Regulations	36
3.1.1	Constitution of Uzbekistan	36
3.1.2	Uzbekistan Policy Framework for Wind Projects	36
3.1.3	President Decree № PD-4477 on the Strategy for the Transition of the Republic of Uzbekistan to a Green Economy in the period 2019-2030	36
3.1.4	Law on Nature Protection, 1992 as Amended in 2019	37
3.1.5	Law on Environmental Control, 2013	37
3.1.6	Environmental Audit Law No. ZRU-678, 2021	37
3.1.7	Law on the Rational Use of Energy, 1997	38
3.1.8	Presidential Decree No. 5863 on Environmental Protection Strategy, 2019	38
3.1.9	Environmental Regulator	41
3.1.10	Presidential Decree No. 169 of 2022 – For the Implementation of a 100 MW Wind Farm in the Karauzak District	41
3.2	International Conventions/Protocol	42
3.3	Project Requirements	43
3.3.1	EBRD	44
3.3.2	Equator Principles	44
3.4	Applicable Environmental Standards	47
3.4.1	Lenders Standards	47
3.5	EIA/ESIA Requirements	48
3.5.1	National Requirements	48
<b>4</b>	<b>APPROACH TO ESIA</b>	<b>51</b>
4.1	ESIA Team	51
4.2	Impact Assessment Methodology	52
4.2.1	Process	52
4.2.2	Impact Assessment Significance Criteria	53
4.2.3	Mitigation and Management Measures	58
4.2.4	Residual Impacts	58
4.2.5	Cumulative Impacts	59
<b>5</b>	<b>STAKEHOLDER ENGAGEMENT</b>	<b>60</b>
5.1	National Requirements	60

5.2	Lender Requirements	60
5.3	Stakeholder Mapping and Engagement Planning	60
5.4	Stakeholder Engagement	64
5.4.1	Public Hearings	64
5.4.2	Local Communities	64
<b>6</b>	<b>AIR QUALITY</b>	<b>66</b>
6.1	Applicable Requirements & Standards	66
6.1.1	National Regulations	66
6.1.2	Lender Requirements	67
6.2	Baseline Conditions	68
6.3	Area of Influence and Receptors	70
6.3.1	Area of Influence	70
6.3.2	Receptors	71
6.4	Potential Impacts, Mitigation, Management & Residual Impacts	73
6.4.1	Construction Phase	73
6.5	Monitoring	77
<b>7</b>	<b>NOISE AND VIBRATION</b>	<b>78</b>
7.1	Applicable Requirements & Standards	78
7.1.1	National Standards	78
7.1.2	Lender Requirements	78
7.2	Baseline Conditions	81
7.2.1	Overview	81
7.2.2	Baseline Noise Survey	81
7.3	Area of Influence and Receptors	90
7.3.1	Area of Influence	90
7.3.2	Receptors	90
7.4	Potential Impacts, Mitigation, Management & Residual Impacts	94
7.4.1	Construction Phase	94
7.4.2	Operation Phase	97
7.5	Monitoring	105
<b>8</b>	<b>GEOLOGY, SOILS AND GROUNDWATER</b>	<b>106</b>
8.1	Applicable Requirements & Standards	106
8.1.1	National Regulations	106
8.1.2	Lender Requirements	106
8.2	Baseline Conditions	109

8.2.1	Topography	109
8.2.2	Geology and Soils	110
8.2.3	Groundwater	115
8.2.4	Seismic Hazard	115
8.3	Area of Influence and Receptors	116
8.3.1	Area of Influence	116
8.3.2	Receptors	116
8.4	Potential Impacts, Mitigation, Management & Residual Impacts	118
8.4.1	Construction Phase	118
8.5	Monitoring	124
9	<b>HYDROLOGY AND SURFACE WATER</b>	<b>125</b>
9.1	Applicable Requirements & Standards	125
9.2	Baseline Conditions	125
9.3	Hydrology Study	126
9.4	Potential Impacts, Mitigation, Management & Residual Impacts	133
9.4.1	Construction Phase	133
9.4.2	Operation Phase	133
9.5	Monitoring	133
10	<b>TERRESTRIAL ECOLOGY AND AVIFAUNA</b>	<b>134</b>
10.1	Applicable Requirements & Standards	134
10.1.1	National Regulations	134
10.1.2	Lender Requirements	134
10.2	Baseline Conditions	136
10.2.1	Terrestrial Ecology	136
10.2.2	Birds and Bats	149
10.2.3	Invasive Species	165
10.2.4	Ecosystem Services	166
10.3	Critical Habitat Assessment	166
10.3.1	Overview	166
10.3.2	Methodology	167
10.3.3	Qualifying Criteria	168
10.3.4	Identifying Biodiversity Elements of Concern	169
10.3.5	Spatial Context	177
10.3.6	Natural and Modified Habitats	177
10.3.7	Migratory Flyways	177
10.3.8	Areas of Conservation Importance	180
10.3.9	Threatened Ecosystems	184

10.3.10	Species Checklist	184
10.3.11	Ecologically Appropriate Area of Analysis	203
10.3.12	Baseline Information Available	211
10.3.13	Critical Habitat Assessment	212
10.3.14	Conclusion	217
10.4	Area of Influence and Receptors	218
10.4.1	Area of Influence	218
10.4.2	Receptors	218
10.5	Potential Impacts, Mitigation, Management & Residual Impacts	227
10.5.1	Construction Phase	227
10.5.2	Operation Phase	250
10.6	Management and Monitoring	267
11	LANDSCAPE AND VISUAL AMENITY	269
11.1	Applicable Requirements & Standards	269
11.1.1	National Regulations	269
11.1.2	Lender Requirements	269
11.2	Baseline Conditions, Zone of Theoretical Visibility and Receptors	269
11.2.1	Study Area	269
11.2.2	Desktop Survey	269
11.2.3	Fieldwork Survey	270
11.2.4	Landscape Character Baseline	270
11.2.5	Landscape Character Areas	271
11.2.6	Visual Amenity Baseline	277
11.3	Potential Impacts	282
11.3.1	Construction Phase	282
11.3.2	Operation Phase	285
11.4	Mitigation, Management & Residual Impacts	295
11.4.1	Mitigation and Management Measures	295
11.4.2	Residual Impacts	295
11.5	Monitoring	295
12	SHADOW FLICKER	296
12.1	Overview	296
12.2	Applicable Requirements & Standards	296
12.2.1	National Requirements	296
12.2.2	Lender Requirements	296
12.3	Shadow Flicker Assessment	297
12.3.1	Methodology	297

12.3.2	Results	299
<b>13</b>	<b>SOLID WASTE AND WASTEWATER MANAGEMENT</b>	<b>303</b>
13.1	Applicable Requirements & Standards	303
13.1.1	National Regulations	303
13.1.2	Lender Requirements	304
13.2	Baseline Conditions	306
13.2.1	Solid Waste	306
13.2.2	Wastewater	308
13.2.3	Site Specific Information	308
13.3	Potential Impacts	309
13.3.1	Construction Phase	309
13.3.2	Operation Phase	312
13.3.3	Decommissioning Phase	313
13.4	Mitigation and Management Measures	314
13.4.1	Waste Characterisation	314
13.4.2	Waste Management Hierarchy	314
13.4.3	Construction Phase	315
13.4.4	Operation Phase	318
13.5	Monitoring	319
<b>14</b>	<b>TRAFFIC AND TRANSPORTATION</b>	<b>320</b>
14.1	Applicable Requirements & Standards	320
14.1.1	National Regulations	320
14.1.2	Lender Requirements	320
14.1.3	Transportation of WTG Components to Site	321
14.2	Area of Influence and Receptors	324
14.2.1	Area of Influence	324
14.2.2	Receptors	324
14.3	Potential Impacts, Mitigation, Management & Residual Impacts	324
14.3.1	Construction Phase	324
14.4	Monitoring	329
<b>15</b>	<b>ARCHAEOLOGY AND CULTURAL HERITAGE</b>	<b>330</b>
15.1	Applicable Requirements & Standards	330
15.1.1	National Regulations	330
15.1.2	Lender Requirements	330
15.2	Baseline Conditions	331
15.2.1	Cultural Heritage	331



15.2.2	Intangible Cultural Heritage	334
15.2.3	Archaeology	336
15.3	Area of Influence and Receptors	338
15.3.1	Area of Influence	338
15.3.2	Receptors	338
15.4	Potential Impacts, Mitigation, Management & Residual Impacts	338
15.4.1	Construction Phase	338
15.5	Monitoring	341
<b>16</b>	<b>SOCIOECONOMICS</b>	<b>342</b>
16.1	Applicable Requirements & Standards	342
16.1.1	National Regulations	342
16.1.2	Lender Requirements	342
16.2	Baseline	343
16.2.1	Political and Administrative Structure	343
16.2.2	Population and Demographics	343
16.2.3	Economy and Employment	345
16.2.4	Land Use	346
16.2.5	Public Services & Utilities	352
16.2.6	Indigenous Peoples	353
16.2.7	Community Baseline Surveys	353
16.3	Receptors	358
16.4	Potential Impacts, Mitigation, Management & Residual Impacts	358
16.4.1	Construction Phase	358
16.4.2	Operation Phase	365
16.5	Monitoring	367
<b>17</b>	<b>COMMUNITY HEALTH, SAFETY &amp; SECURITY</b>	<b>368</b>
17.1	Applicable Requirements & Standards	368
17.1.1	National Regulations	368
17.1.2	Lenders Requirement	369
17.2	Baseline Conditions	371
17.2.1	Nearby Communities	371
17.2.2	Health Protection Zone	371
17.2.3	Existing Public Infrastructure	372
17.2.4	Gender based Violence, Harassment and Exploitation	372
17.3	Potential Impacts, Mitigation, Management & Residual Impacts	373
17.3.1	Construction Phase	373
17.3.2	Operational Phase	377

17.3.3	Mitigation and Management Measures	379
17.4	Monitoring	386
18	LABOUR AND WORKING CONDITIONS	388
18.1	Applicable Requirements & Standards	388
18.1.1	National Regulations	388
18.1.2	Lender Requirements	391
18.2	Baseline Conditions	395
18.3	Potential Impacts, Mitigation, Management & Residual Impacts	399
18.3.1	Construction Phase	399
18.3.2	Operational Phase	408
18.3.3	Mitigation and Management Measures	410
18.4	Monitoring	421
19	CLIMATE AFFAIRS	423
19.1	Applicable Requirements & Standards	423
19.1.1	National Requirements	423
19.1.2	Lender Requirements	424
19.2	National Context	424
19.3	Climate Projections	425
19.4	Potential Project Impacts on Climate Change	426
19.4.1	Construction Phase	426
19.4.2	Operational Phase	427
19.5	Vulnerability of the Project to Climate Change	427
19.5.1	Climate Transition Risks	428
20	CUMULATIVE IMPACT ASSESSMENT	429
21	REFERENCES	430

## FIGURES

Figure 2-1 Project Location – National Context .....	8
Figure 2-2 Project Location – Local Context.....	9
Figure 2-3 General View of Wind Farm Site .....	10
Figure 2-4 Typical Access Road Conditions.....	11
Figure 2-5 Cultural, Industrial and Social Receptors.....	13
Figure 2-6 Local Communities .....	18
Figure 2-7 Potential Future Projects .....	20
Figure 2-8 WTG Appearance (Envision, nd).....	21
Figure 2-9 Project Layout.....	22
Figure 2-10 Power Evacuation Infrastructure .....	23
Figure 2-11 Laydown Areas.....	26
Figure 2-12 Previous Layout.....	33
Figure 2-13 OHTL Layout Differences.....	34
Figure 2-14 Access Road Differences .....	35
Figure 5-1 Public Hearing in Beruniy .....	64
Figure 5-2 Consultations with Women in Abay Community .....	65
Figure 6-1 Stack Emissions from the Cement Plants .....	69
Figure 6-2 Stockpiling at a Vermiculite Mine .....	69
Figure 6-3 Air Quality Sensitive Receptors .....	72
Figure 7-1 Noise Monitoring Locations .....	82
Figure 7-2 Noise Levels at N1 .....	86
Figure 7-3 Noise and Wind Speed at N1 .....	86
Figure 7-4 Noise Levels at N2 .....	87
Figure 7-5 Noise and Wind Speed at N2.....	87

Figure 7-6 Noise Levels at N3 .....	88
Figure 7-7 Noise and Wind Speed at N3 .....	88
Figure 7-8 Noise Levels at N4 .....	89
Figure 7-9 Noise and Wind Speed at N4 .....	89
Figure 7-10 Construction Noise Sensitive Receptors .....	91
Figure 7-11 Operational Noise Buffer Zone .....	93
Figure 7-12 EN171 6.5 MW – Sound Power Level .....	99
Figure 7-13 EN171 6.5 MW – Octave Data (10 m/s) .....	99
Figure 7-14 Noise Contours at 5 m/s.....	101
Figure 7-15 Noise Contours at 10 m/s.....	102
Figure 8-1 General Site Topography .....	109
Figure 8-2 Undulating Topography.....	110
Figure 8-3 Historic Geological Exploration Near Access Road .....	111
Figure 8-4 Soil Sampling Locations.....	113
Figure 8-5 Groundwater Pumping for Livestock.....	115
Figure 9-1 Amu-Darya River Relative to the Project.....	125
Figure 9-2 Annual Total Precipitation and Average Temperature from Nukus Meteorological Station.....	126
Figure 9-3 Maximum Daily Precipitation from Nukus Meteorological Station.....	127
Figure 9-4 Sub-basins and River Network.....	128
Figure 9-5 Sub-basins .....	129
Figure 9-6 Maximum Water Depth Map for 100-year Storm Event .....	130
Figure 9-7 Maximum Water Depth Map for 50-year Storm Event .....	131
Figure 9-8 WTG - Potential Risky Area - 1 in 100-year Storm.....	132
Figure 10-1 Habitat Map .....	137
Figure 10-2 Examples of Habitat Communities.....	138

Figure 10-3 <i>Lepidium subcordatum</i> near OHTL. (A) is the location of the 8 specimens, (B) is the location of the 11 specimens.....	139
Figure 10-4 Known locations and geographical range of <i>Lepidium subcordatum</i>	140
Figure 10-5 Winter and Spring Mammal Survey Effort .....	141
Figure 10-6 Camera Trap Locations .....	141
Figure 10-7 Goitered Gazelle Registrations.....	142
Figure 10-8 Goitered Gazelle Camera Trap Images.....	143
Figure 10-9 Location of Corsac Fox Excrement.....	143
Figure 10-10 Presumed Caracal Registration Point .....	144
Figure 10-11 Spring Reptile Survey Effort .....	146
Figure 10-12 Summer Reptile Survey Effort .....	148
Figure 10-13 Location of Vantage Points.....	150
Figure 10-14 Houbara Bustard transect survey locations .....	151
Figure 10-15 Houbara Bustard Specialised Survey Locations.....	152
Figure 10-16 Transect 1 of the Raptor Nest Searching Survey .....	154
Figure 10-17 Transect 2 of the Raptor Nest Searching Survey .....	154
Figure 10-18 Transect 3 of the Raptor Nest Searching Survey .....	155
Figure 10-19 Transect 4 of the raptor nests searching survey .....	155
Figure 10-20 VP Survey Locations for the OHTL alignment .....	156
Figure 10-21 Updated Vantage Point Along OHTL .....	157
Figure 10-22 Locations of Bat Static Detectors (SD) and Transects .....	163
Figure 10-23 Bat Activity Results.....	164
Figure 10-24 Bat Roost Survey Effort and Roost Locations .....	165
Figure 10-25 IUCN Red List Categories .....	170
Figure 10-26 Polygon Boundary for Species Query .....	171
Figure 10-27 Global Migratory Flyways .....	177

Figure 10-28 Predicted Migratory Flight Paths – Northbound National Context.....	178
Figure 10-29 Predicted Migratory Flight Paths – Northbound Regional Context .....	179
Figure 10-30 Predicted Migratory Flight Paths – Southbound.....	180
Figure 10-31 Protected Area – Lower Amudarya Biosphere Reserve.....	181
Figure 10-32 IBAs (Purple Polygons) within 100 km of the Project Site (Red Marker) .	182
Figure 10-33 Khorezm State Natural Park.....	183
Figure 10-34 EAAA - Migratory Waterbirds.....	204
Figure 10-35 EAAA – Raptors.....	205
Figure 10-36 EAAA – Groundbirds.....	206
Figure 10-37 EAAA – Bats.....	207
Figure 10-38 EAAA - Mammals (Large Home Range).....	208
Figure 10-39 EAAA - Mammals (Small Home Range).....	208
Figure 10-40 EAAA - Bukhara Red Deer .....	209
Figure 10-41 EAAA - Reptiles (Large Home Range) .....	210
Figure 10-42 EAAA - Reptiles (Small Home Range) .....	210
Figure 10-43 EAAA – Flora.....	211
Figure 11-1 Indicative Image of LCA 1 - Desert.....	272
Figure 11-2 Indicative Image of LCA 2 - Karatau Hills (in background) .....	273
Figure 11-3 Indicative Image of LCA 3 - Industrial.....	274
Figure 11-4 Landscape Character Areas .....	276
Figure 11-5 Hub Height Zone of Theoretical Visibility.....	278
Figure 11-6 Blade Tip Zone of Theoretical Visibility .....	279
Figure 12-1 Shadow Days per Year, Worst Case .....	300
Figure 12-2 Hours per Year, Worst Case .....	301
Figure 12-3 Max Minutes per Shadow Day, Worst Case .....	302
Figure 13-1 Scope of the Karakalpakstan Solid Waste Project (CECT, 2022) .....	307

---

Figure 13-2 Waste Management Hierarchy (UNEP, 2011) .....	315
Figure 14-1 Helipads next to Mining Facility .....	322
Figure 14-2 Transport Survey Route.....	323
Figure 15-1 Chilpak Kala.....	332
Figure 15-2 The Sultan Uwais Baba Complex .....	332
Figure 15-3 Cultural Sites.....	333
Figure 16-1 Karauzak Population by Year (UNDP, 2018) .....	344
Figure 16-2 Local Communities .....	344
Figure 16-3 Oil Storage Facility .....	345
Figure 16-4 Land Ownership Diagram.....	347
Figure 16-5 Herding Activity at Site in December 2021 .....	348
Figure 16-6 Location of Shelters Identified in December 2021 .....	349
Figure 16-7 Location of Active Shelters in April 2022 .....	351

## TABLES

Table 1-1 Scoping Exercise Summary.....	3
Table 2-1 Key Project Information .....	7
Table 2-2 Existing Receptors.....	14
Table 2-3 Proximity of Local Communities .....	18
Table 2-4 WTG Specifications .....	21
Table 2-5 Water Consumption Estimates .....	28
Table 2-6 Key Project Milestone/Timeline Dates.....	30
Table 3-1 International Protocols and Conventions.....	42
Table 3-2 ILO Conventions Ratified by Uzbekistan .....	43
Table 4-1 5 Capitals' Project Team .....	51
Table 4-2 Juru Energy Project Team .....	51
Table 4-3 Overview of the ESIA process.....	52
Table 4-4 Receptor Sensitivity Criteria .....	53
Table 4-5 Impact Magnitude Criteria.....	56
Table 4-6 Criteria for Determining Significance of Effects .....	57
Table 4-7 Definition of Significance .....	57
Table 5-1 Stakeholder Mapping and Engagement.....	61
Table 6-1 Ambient Air Quality MPC (mg/m <sup>3</sup> ) .....	66
Table 6-2 EC Ambient Air Quality Standards (µg/m <sup>3</sup> unless stated) .....	67
Table 6-3 WHO Ambient Air Quality Standards (µg/m <sup>3</sup> ) .....	68
Table 6-4 Air Quality Area of Influence .....	70
Table 6-5 Receptor Sensitivity to Air Impacts.....	73
Table 6-6 Air Quality Impact Significance, Mitigation Measures and Residual Impacts .....	75



---

Table 6-7 Air Quality – Monitoring Requirements .....	77
Table 7-1 Noise Limits under SanPiN No.0267-09 .....	78
Table 7-2 Work Environment Noise Limits .....	78
Table 7-3 Noise Limits under SanPiN No. 0339-16 .....	78
Table 7-4 World Bank Ambient Noise Level Guidelines .....	79
Table 7-5 Noise Monitoring Locations .....	83
Table 7-6 Baseline Noise Monitoring Results.....	85
Table 7-7 Receptor Sensitivity to Noise Impacts.....	92
Table 7-8 Noise Level of Typical Construction Equipment.....	94
Table 7-9 Cumulative Construction Noise Assessment .....	95
Table 7-10 Construction Phase Noise – ABC Assessment .....	96
Table 7-11 Noise Levels at Receptors.....	100
Table 7-12 Noise and Vibration Impact Significance, Mitigation Measures and Residual Impacts.....	104
Table 8-1 Dutch Soil and Groundwater Standards .....	107
Table 8-2 Soil Sampling Locations .....	111
Table 8-3 Soil Analysis Results .....	114
Table 8-4 Geology, Soil and Groundwater Area of Influence .....	116
Table 8-5 Geology and Soil Receptor Sensitivity .....	116
Table 8-6 Groundwater Receptor Sensitivity .....	117
Table 8-7 Geology, Soil and Groundwater Sensitive Receptors .....	117
Table 8-8 Primary exposure pathways .....	120
Table 8-9 Geology, Soil and Groundwater Impact Significance, Mitigation Measures and Residual Impacts.....	122
Table 8-10 Geology, Soils and Groundwater – Monitoring Requirements .....	124
Table 10-1 Mammal Survey Results.....	145

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---

10-2 Reptile Spring Survey Results .....	147
Table 10-3 Reptile Summer Survey Results .....	148
Table 10-4 Species Recorded During VP and Nest Searching.....	157
Table 10-5 OHTL Bird Survey Results .....	160
Table 10-6 Identified Bat Species in the Project Area.....	163
Table 10-6 Bat Static Detector Results.....	164
Table 10-7 Conservation Areas within 100 km of Project.....	181
Table 10-8 IBA Trigger Criteria - Muskinata Forest.....	182
Table 10-9 IBA Trigger Criteria - Khorezm Fish Farm and Adjacent Lakes .....	183
Table 10-10 Biodiversity Species Checklist .....	185
Table 10-11 Critical Habitat Assessment .....	212
Table 10-12 Potential Ecological Sensitive Receptors.....	219
Table 10-13 Unmitigated Significance of Habitat Loss .....	227
Table 10-14 Residual Significance of Habitat Loss .....	228
Table 10-15 Unmitigated Significance of Vegetation Removal .....	228
Table 10-16 Unmitigated Significance of Earthworks Mortality .....	228
Table 10-17 Residual Significance of Vegetation Removal .....	229
Table 10-18 Residual Significance of Earthworks Mortality .....	230
Table 10-19 Unmitigated Significance of Vehicular Collision.....	230
Table 10-20 Residual Significance of Vehicular Collision.....	232
Table 10-21 Unmitigated Significance of "Take" .....	233
Table 10-22 Residual Significance of "Take" .....	234
Table 10-23 Unmitigated Significance of Littering.....	235
Table 10-24 Residual Significance of Littering .....	236
Table 10-25 Unmitigated Significance of Disturbance .....	237
Table 10-26 Residual Significance of Disturbance .....	237

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---

Table 10-27 Unmitigated Significance of Displacement .....	238
Table 10-28 Residual Significance of Displacement .....	239
Table 10-29 Unmitigated Significance of Proliferation.....	240
Table 10-30 Residual Significance of Proliferation.....	240
Table 10-31 Unmitigated Significance of Introduced Species.....	241
Table 10-32 Residual Significance of Introduced Species.....	242
Table 10-33 Unmitigated Significance of Fugitive Dust.....	242
Table 10-34 Unmitigated Significance of Air Pollution .....	242
Table 10-35 Residual Significance of Fugitive Dust .....	243
Table 10-36 Residual Significance of Air Pollution .....	243
Table 10-37 Unmitigated Significance of Noise Impacts.....	244
Table 10-38 Residual Significance of Noise Impacts.....	245
Table 10-39 Unmitigated Significance of Light Pollution.....	246
Table 10-40 Residual Significance of Light Pollution .....	246
Table 10-41 Unmitigated Significance of Contamination .....	247
Table 10-42 Residual Significance of Contamination.....	248
Table 10-43 Unmitigated Significance of Soil Impacts.....	248
Table 10-44 Residual Significance of Soil Impacts.....	249
Table 10-45 Estimated Rates of Collisions per Year for Bird Species .....	251
Table 10-46 Magnitude of Predicted Turbine Collision Impact – Birds .....	252
Table 10-47 Unmitigated Significance of Turbine Collision – Birds.....	252
Table 10-48 Residual Significance of Turbine Collision – Birds .....	253
Table 10-49 Magnitude of Predicted Turbine Collision Impact – Bats .....	255
Table 10-50 Unmitigated Significance of Turbine Collision (Bats) .....	255
Table 10-51 Residual Significance of Turbine Collision (Bats) .....	256
Table 10-52 Magnitude of Predicted OHTL Collision Impact – Birds .....	256

---

---

Table 10-53 Unmitigated Significance of OHTL Collision – Birds .....	257
Table 10-54 Residual Significance of OHTL Collision – Birds .....	259
Table 10-55 Unmitigated Significance of OHTL Electrocution – Birds .....	260
Table 10-56 Residual Significance of OHTL Electrocution (Birds) .....	261
Table 10-57 Unmitigated Significance of Disturbance .....	262
Table 10-58 Unmitigated Significance of Displacement .....	263
Table 10-59 Unmitigated Significance of Noise Impacts .....	264
Table 10-60 Unmitigated Significance of Lighting Impacts .....	265
Table 11-1 Landscape Receptors .....	275
Table 11-2 Visual Receptors .....	280
Table 11-3 Landscape Character Impacts - Construction .....	283
Table 11-4 Visual Amenity Impacts - Construction.....	283
Table 11-5 Viewpoint 1 Wireframe .....	286
Table 11-6 Viewpoint 2 Wireframe .....	287
Table 11-7 Viewpoint 3 Wireframe .....	288
Table 11-8 Viewpoint 4 Wireframe .....	289
Table 11-9 Viewpoint 5 Wireframe .....	290
Table 11-10 Viewpoint 6 Wireframe.....	291
Table 11-11 Viewpoint 7 Wireframe.....	292
Table 11-12 Summary of Visual Amenity Impacts - Operation.....	293
Table 11-13 Landscape Character Impacts - Operation.....	294
Table 12-1 Shadow Flicker Receptors Considered .....	297
Table 12-2 WTG Characteristics for Shadow Flicker Modelling .....	298
Table 12-3 Sunshine Hours for Realistic Scenario .....	299
Table 12-4 WTG Characteristics for Shadow Flicker Modelling .....	299
Table 13-1 Waste Characterisation .....	314

---

---

Table 13-2 Waste and Wastewater Construction Phase Mitigation and Management Measures .....	315
Table 13-3 Waste and Wastewater Operation Phase Mitigation and Management Measures .....	318
Table 13-4 Waste and Wastewater Monitoring Requirements.....	319
Table 14-1 Receptor Sensitivity to Traffic and Transportation Impacts.....	324
Table 14-2 Traffic and Transportation Impact Significance, Mitigation Measures and Residual Impacts.....	327
Table 14-3 Traffic and Transportation Monitoring Requirements .....	329
Table 15-1 Intangible Cultural Heritage of Uzbekistan.....	334
Table 15-2 Archaeological Finds .....	337
Table 15-3 Archaeology and Cultural Heritage Sensitive Receptors .....	338
Table 15-4 Cultural Heritage and Archaeology Impact Significance, Mitigation Measures and Residual Impacts .....	340
Table 15-5 Archaeological & Cultural Heritage - Monitoring Requirements .....	341
Table 16-1 Population Breakdown for Abay Community .....	354
Table 16-2 Population Breakdown for Altinsay Community .....	356
Table 16-3 Potential Socio-Economic Receptors .....	358
Table 16-4 Socioeconomics Impact Significance, Mitigation & Management Measures and Residual Impacts – Construction .....	362
Table 16-5 Socioeconomics Impact Significance, Mitigation & Management Measures and Residual Impacts – Operation .....	366
Table 16-6 Socioeconomic Monitoring Requirements – Construction and Operation .....	367
Table 17-1 Community Health, Safety and Security Mitigation and Management Measures - Construction Phase .....	379
Table 17-2 Community Health, Safety and Security Mitigation and Management Measures - Operation Phase .....	384

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---

Table 17-3 Key Monitoring Indicators .....	386
Table 18-1 Sectors and Work Streams Employing Child Labour in Uzbekistan.....	397
Table 18-2 Mechanisms for Governmental Coordination of Child Labour Eradication Requirements Set out in Uzbekistan's Legal Framework.....	398
Table 18-3 Labour and Working Conditions Mitigation and Management Measures – Construction.....	410
Table 18-4 Labour and Working Conditions Mitigation and Management Measures – Operation.....	417
Table 18-5 Labour and Working Conditions Key Monitoring indicators .....	421
Table 19-1 GHG Emissions from the Use of Diesel During Project Construction .....	426

## LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
<b>5 Capitals</b>	5 Capitals Environmental & Management Consultancy
<b>AAC</b>	Approximate Allowable Concentrations
<b>AIDS</b>	Acquired Immunodeficiency Syndrome
<b>AIIB</b>	Asian Infrastructure Investment Bank
<b>ACGIH</b>	American Conference of Governmental Industrial Hygienists
<b>ALARP</b>	As Low as Reasonably Practicable
<b>AZE</b>	Alliance for Zero Extinction
<b>BOP</b>	Balance of Plant
<b>CA</b>	Collision Avoidance
<b>CAA</b>	Civil Aviation Authority
<b>CAP</b>	Corrective Action Plan
<b>CESMP</b>	Construction Environmental and Social Management Plan
<b>CFP</b>	Chance Find Procedure
<b>CIPS</b>	Chartered Institute of Procurement & Supply
<b>COVID-19</b>	Coronavirus Disease 2019
<b>COD</b>	Commercial Operation Date
<b>COO</b>	Countries of Operation
<b>CWMP</b>	Construction Waste Management Plan
<b>DFI</b>	Development Finance Institutions
<b>DTM</b>	Digital Terrain Model
<b>E&amp;S</b>	Environmental and Social
<b>EAAA</b>	Ecologically Appropriate Area of Analysis
<b>EBA</b>	Endemic Bird Areas
<b>EBRD</b>	European Bank for Reconstruction and Development
<b>EHS</b>	Environmental, Health and Safety
<b>EI</b>	Evacuation Infrastructure
<b>EIA</b>	Environmental Impact Assessment
<b>EPC</b>	Engineering, Procurement and Construction
<b>EPFIs</b>	Equator Principles Financial Institutions
<b>ESA</b>	Environmental and Social Assessment
<b>ESIA</b>	Environmental & Social Impact Assessment
<b>ESP</b>	Environmental and Social Policy
<b>GBVH</b>	Gender Based Violence and Harassment
<b>GDP</b>	Gross Domestic Product
<b>GHG</b>	Greenhouse Gas
<b>GIIP</b>	Good International Industry Practice
<b>GOU</b>	Government of Uzbekistan
<b>GRM</b>	Grievance Redress Mechanism
<b>GRP</b>	Gross Regional Product
<b>HGV</b>	Heavy Goods Vehicles

ABBREVIATION	MEANING
<b>HIV</b>	Human Immunodeficiency Virus
<b>HSE</b>	Health, Safety and Environment
<b>IAQM</b>	Institute of Air Quality Management
<b>IBA</b>	Important Bird Area
<b>IFC</b>	International Finance Corporation
<b>ILO</b>	International Labour Organisation
<b>IMF</b>	International Monetary Fund
<b>IUCN</b>	International Union for Conservation of Nature
<b>KBA</b>	Key Biodiversity Area
<b>LLA</b>	Land Lease Agreement
<b>MOE</b>	Ministry of Energy
<b>MSDS</b>	Material Safety Data Sheets
<b>MPC</b>	Maximum Permissible Concentrations
<b>NEGU</b>	National Electric Grid of Uzbekistan
<b>OESMP</b>	Operational Environmental and Social Management Plan
<b>OHTL</b>	Overhead Transmission Line
<b>OHS</b>	Occupational Health and Safety
<b>OVOS</b>	National Uzbekistan acronym for the EIA assessment process
<b>OWMP</b>	Operational Waste Management Plan
<b>PAP</b>	Project Affected Person
<b>PBF</b>	Priority Biodiversity Features
<b>PEF</b>	Purchase Electrical Facilities
<b>PPA</b>	Power Purchase Agreement
<b>PPE</b>	Personal Protective Equipment
<b>PPP</b>	Public-Private Partnership
<b>PR</b>	Performance Requirement
<b>RDB</b>	Red Data Book
<b>SAC</b>	Special Areas of Conversation
<b>SCEEP</b>	State Committee of the Republic of Uzbekistan on Environmental Protection
<b>SEA</b>	Sexual Exploitation and Abuse
<b>SEP</b>	Stakeholder Engagement Plan
<b>SH</b>	Sexual Harassment
<b>SLM</b>	Sound Level Meter
<b>SME</b>	Small to Medium Enterprises
<b>SNH</b>	Scottish Natural Heritage
<b>SPA</b>	Special Protection Areas
<b>SRTM</b>	Shuttle Radar Topography Mission
<b>STI</b>	Sexually Transmitted Illness
<b>SWID</b>	State Committee on Sericulture and Wool Industry Development
<b>TBT</b>	Toolbox Talks
<b>ToR</b>	Terms of Reference
<b>UN</b>	United Nations



ABBREVIATION	MEANING
<b>UNESCO</b>	United Nations Educational, Scientific, and Cultural Organisation
<b>VP</b>	Vantage Point
<b>WBG</b>	World Bank Group
<b>WDA</b>	Wind Development Area
<b>WHO</b>	World Health Organisation
<b>WTG</b>	Wind Turbine Generator
<b>ZTV</b>	Zone of Theoretical Visibility

# 1 INTRODUCTION

## 1.1 National Context

The Government of the Republic of Uzbekistan (GOU) through the Ministry of Energy aims to increase the electricity production in the country from 12.9 GW in 2019 to 29.3 GW in 2030 in order to foster economic growth as part of the Republic of Uzbekistan (Uzbekistan) 2030 Energy Strategy.

The Uzbekistan 2030 Energy Strategy defines the mid-term and long-term objectives and direction for development in the power sector to ensure electricity supply in Uzbekistan. One of the objectives of the Energy Strategy includes the development and expansion of renewables and their integration into the unified power system.

In regard to the development of wind farms, the Energy Strategy states the following as priority:

*"Creation of large-scale wind farms with single site capacities ranging from 100 MW to 500 MW mostly concentrated in North-Western region (Republic of Karakalpakstan and Navoi region) shall be the main priority of wind power development"*

Of the 29.3 GW of power generating capacity in 2030, 8 GW will be from renewable energy, with wind power accounting for 3 GW.

The Nukus 100 MW Wind Farm is a facility contributing towards the 2030 Energy Strategy.

## 1.2 The Project

The GOU has signed a memorandum of understanding with the European Bank for Reconstruction and Development (EBRD) with a view to cooperate on the development of large-scale wind power projects up to a total capacity of 1,000 MW.

ACWA Power have been awarded the contract to design, finance, construct, operate, maintain and (at the request of the GOU) decommission or transfer, the Karatau 100 MW Wind Project (including an access road and the Evacuation Infrastructure (EI), comprising an OHTL (approximately 16 km) and substation) (the Project) in the Qorao'zak District of the Republic of Karakalpakstan.

## 1.3 Scope of Document

5 Capitals Environmental and Management Consulting (5 Capitals) has been engaged by ACWA Power to undertake the independent Environmental Impact Assessment (EIA) and

Environmental and Social Impact Assessment (ESIA) processes, as well as certain other environmental & social related scope.

ACWA Power is seeking an amount of project finance from financial Institutions who have their own internal environmental & social investment policies/standards or may be members of voluntary agreements such as the Equator Principles. In addition to the Project requiring alignment with the environmental and social policies and guidelines of those who are providing financing, the Project is required to be delivered in accordance with the EBRD Environmental and Social Policy (ESP) 2019 and supporting Performance Requirements (PR), the Equator Principles IV 2020 and the technical performance criteria set out in certain International Finance Corporation (IFC) / World Bank Group (WBG) Environmental, Health and Safety (EHS) Guidelines.

Based on the requirements of these institutions, a process for undertaking Environmental & Social Impact Assessment (ESIA) to assess potential impacts and determine suitable mitigation measures and monitoring plans will be necessary as a process to reach financial close.

This ESIA has been informed by:

- The ESIA Scoping Report prepared by 5 Capitals and issued in January 2022;
- Analysis of the Project details and proposed works (as advised by ACWA Power);
- Review of the Environmental and Social Assessment (ESA) prepared by Juru Energy (2021), issued in April 2021 as part of the tender documentation;
- Initial consultations with stakeholders, including herders, ministries and nearby industrial facilities;
- Desk-based study of available mapping and aerial photography;
- The initial site visit in December 2021 and subsequent site visits;
- The Bird Baseline Survey provided as part of the tender documentation which comprised bird surveys conducted from 25<sup>th</sup> April 2020 to April 25<sup>th</sup> 2021 and Collision Risk Modelling (CRM) for the Wind Turbine Generator (WTG) site;
- Site surveys conducted between December 2021 and November 2022 (including spring and summer botany surveys, spring and summer reptile surveys, bat surveys between May and October 2022, mammal surveys spanning winter 2021 to summer 2022, soil quality sampling and analysis, noise monitoring, and bird surveys from Winter 2021 to Autumn 2022 along the Overhead Transmission Line (OHTL))
- Review of available secondary information, including but not limited to:
  - BirdLife International <birdlife.org>; World Database of Protected Areas <protectedplanet.net>; Key Biodiversity Areas <keybiodiversityareas.org>;

Climate Change Knowledge Portal - World Bank Group  
<<https://climateknowledgeportal.worldbank.org>> etc.;

- 5 Capitals' experience of conducting ESIA for similar wind projects in Uzbekistan and the wider region; and
- 5 Capitals' experience of working with lenders to ensure necessary financing requirements are met.

## 1.4 Scoping Exercise Summary

An ESIA Scoping Report was prepared by 5 Capitals and issued in January 2022, refer to **Volume 4 – Appendices**. A key objective of the Scoping Report is to determine the scope of the environmental aspects (e.g., air, noise, ecology) that will be included in this ESIA Report. The following table summarises the scoping exercise outcomes.

**Table 1-1 Scoping Exercise Summary**

ASPECT	CONSTRUCTION / OPERATION	SCOPED	JUSTIFICATION
Air Quality	Construction	In	Natural ambient dust concentrations can be high in the Project area, there is a receptor located immediately adjacent to the proposed access road and the construction phase will likely result in dust and gas emissions.
	Operation	Out	The Project will have no operational air emissions besides the use of operation staff vehicles which is not expected to result in discernible air impacts.
Noise	Construction	In	Construction activities will result in noise emissions and there is a receptor located immediately adjacent to the proposed access road.
	Operation	In	Even though the nearest residential receptor is located >3.5 km from the closest turbine, operational noise has been scoped in as a precautionary measure due to the fact that the operation of wind turbines can generate noise some distance off site depending on conditions.
Geology, Soils, Surface Water and Groundwater*	Construction	In	The construction of the Project will require interaction with subsurface conditions and will also alter the topography.
	Operation	Out	Specific project impacts to soil, geology and groundwater are not expected during the operational phase as the site will be static and will not have direct interactions with these environmental parameters. Potential risks of concern during the operational phase are expected to be limited to the management and storage of hazardous materials/wastes/wastewater, chemicals and fuels and sanitary provision.
Terrestrial Ecology and Avifauna	Construction	In	Construction activities will impact flora and fauna both directly and indirectly.

ASPECT	CONSTRUCTION / OPERATION	SCOPED	JUSTIFICATION
	Operation	In	The operation of wind turbines can lead to fatalities of fauna, for example collision risks to avifauna species.
Landscape and Visual Amenity	Construction	In	The construction and operation of the Project will result in significant landscape changes. Shadow flicker has also been scoped in as a precautionary measure.
	Operation	In	
Solid Waste and Wastewater Management	Construction	In	The construction and operation of the Project will result in the generation of waste and wastewater (it is noted that the construction phase will generate a larger quantity of waste). If waste is not appropriately managed then it may have significant impacts on the environment. The Karakalpakstan region was found to have limited waste management facilities.
	Operation	In	
Traffic and Transportation	Construction	In	The construction phase will require the movement of workers, construction materials, wastes etc and the use of heavy goods vehicles. In addition, the transportation of wind turbines can result in impacts and requires dedicated planning and infrastructure.
	Operation	Out	Transportation impacts during the operation phase are not expected to be significant, as the operation of the Project will not require continuous delivery of materials or other equipment to operate. General operation and maintenance of the Project will require vehicle movement however, this will be restricted to security and maintenance teams using light vehicles, pick-ups and small vans. As such, the limited vehicle movements for operation and maintenance are not expected to result in discernible or significant impacts on existing road infrastructure.
Cultural Heritage	Construction	In	If cultural features of importance are identified in/or near footprints of works there is the potential for impacts.
	Operation	Out	An operation phase impact assessment for cultural heritage is not proposed due to the fact that there will not be the requirement for any additional land excavation or land take as a result of the operation phase.
Socioeconomics	Construction	In	Socioeconomic impacts are expected during both the construction and operation phase and include both positive and negative.
	Operation	In	
Community Health, Safety & Security	Construction	In	There is the potential for varied impacts to aspects of community health, safety and security in the construction phase.
	Operation	In	In rare cases, the operation of wind turbines can result in blade and ice throw.
	Construction	In	

ASPECT	CONSTRUCTION / OPERATION	SCOPED	JUSTIFICATION
Labour & Working Conditions	Operation	In	The Project will require a dedicated construction and operation workforce.
Climate Affairs	Construction	In	Climate affairs impacts includes physical impacts, positive and negative impacts from the Project on the climate and also climate transition risks.
	Operation	In	
* In this ESIA hydrology is a dedicated, separate chapter.			

## 1.5 Objectives of the ESIA Report

The primary objectives of the ESIA are as follows:

- Provide an overview of the Project design and construction and operational processes and requirements;
- Identification of sensitive receptors in the Project's areas of influence;
- Review of the regulatory and legislative framework, including national laws, applicable international regulations and standards, and international lender requirements;
- Assessment of the existing environmental baseline conditions prior to the development of the Project through a review of available existing data and the undertaking of environmental baseline surveys;
- Assessment of the Project's environmental and social impacts for the construction and operational phases;
- Assessment of the Project's alternatives;
- Determination of applicable mitigation and management measures to be implemented in order to avoid or minimise potential adverse impacts and enhance beneficial impacts;
- Preparation of a framework for which the construction and operational phase management systems and plans can be developed and implemented.

In addition to this ESIA, the Project requires an EIA in compliance with Uzbekistan national EIA requirements (OVOS). 5 Capitals has partnered with a locally based consultant, 'Juru Energy' (based in Tashkent, Uzbekistan) to undertake certain elements of the scope, including baseline surveys, consultations and submission of the national EIA to the State Committee of the Republic of Uzbekistan on Environmental Protection (SCEEP). This is a separate process and is subject to different EIA documentation that is specific to the SCEEP. The national EIA was approved in June 2022, with the approval provided in Volume 4. Approval at Stage 1 was attained, meaning that Stage II is not required. Stage III of the National EIA process shall be required following construction, before operation commences.

## 1.6 Structure of the ESIA Report

To align the ESIA with the requirements for environmental and social assessment established by the various lenders and good practice, the ESIA report is proposed to be presented in the following format developed by 5 Capitals:

- Volume 1: Non-Technical Summary
- Volume 2: ESIA - Main Text, Tables and Figures
- Volume 3: Framework for Environmental & Social Management
- Volume 4: Appendices

**Volume 1** is a Non-Technical Summary (NTS) of the ESIA, including the main outcomes, and conclusions.

**Volume 2** is the main text of the ESIA and full impact assessment, with mitigation, management and monitoring measures identified.

**Volume 3** is the Framework for Environmental and Social Management as outlined above.

**Volume 4** includes the technical appendices relevant to the studies and this ESIA.

## 2 PROJECT INFORMATION

### 2.1 Key Project Information

**Table 2-1 Key Project Information**

<b>PROJECT TITLE</b>	Nukus 100 MW Wind Farm
<b>PROJECT DEVELOPER</b>	ACWA Power
<b>PROJECT COMPANY</b>	"ACWA POWER WIND KARATAU" FE LLC
<b>OFF TAKER</b>	JSC National Electric Grid of Uzbekistan (NEGU)
<b>EPC CONTRACTOR</b>	To be confirmed
<b>O&amp;M COMPANY</b>	To be confirmed
<b>ENVIRONMENTAL CONSULTANT</b>	5 Capitals Environmental and Management Consultancy (5 Capitals) PO Box 119899, Dubai, UAE Tel: +971 (0) 4 343 5955, Fax: +971 (0) 4 343 9366 <a href="http://www.5capitals.com">www.5capitals.com</a>
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### 2.2 Project Location

The Project is located in a greenfield location in Karatau mountain region in Karauzak District, in the Republic of Karakalpakstan, Uzbekistan. The site is situated around 730 km west of Tashkent, 83 km east of the city of Nukus, and 62 km north of the city of Urgench.

The allocated site boundary for the WTGs is within a 1,678-hectare area, although the land take required will be limited to WTG locations and the internal access road, located at an altitude ranging from approximately 250 - 345 m above sea level. As part of the Project, a new 220 kV overhead transmission line (OHTL) approximately 16 km in length will connect to an existing 220 kV OHTL near to the highway A380 and an access road approximately 12 km in length will connect the Project area with an existing road to the north-west which connects the A380 to the settlements Aimbed-Ishan and Karauzak to the north.

The following figures depict the national and local context of the Project.



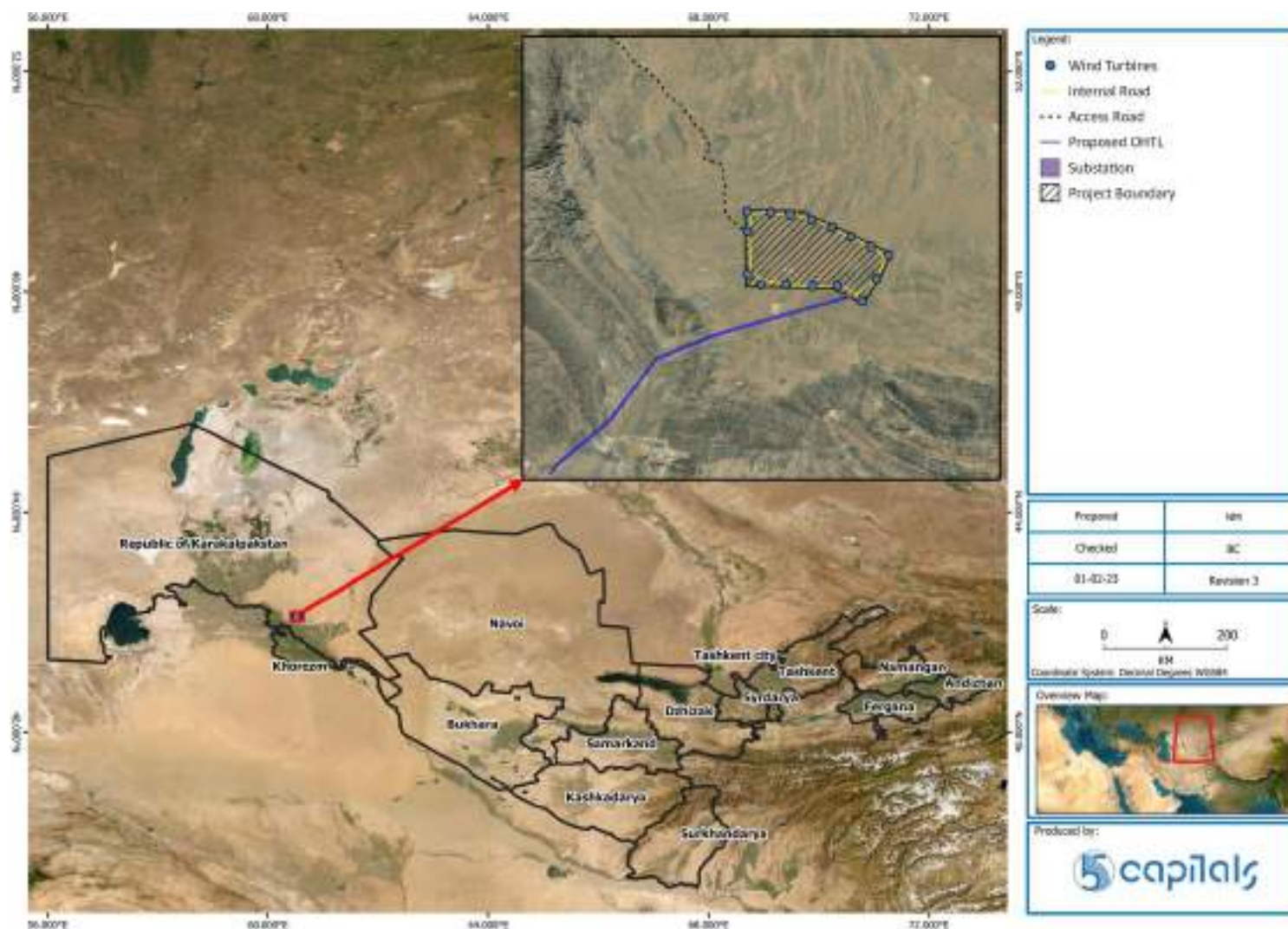


Figure 2-1 Project Location – National Context

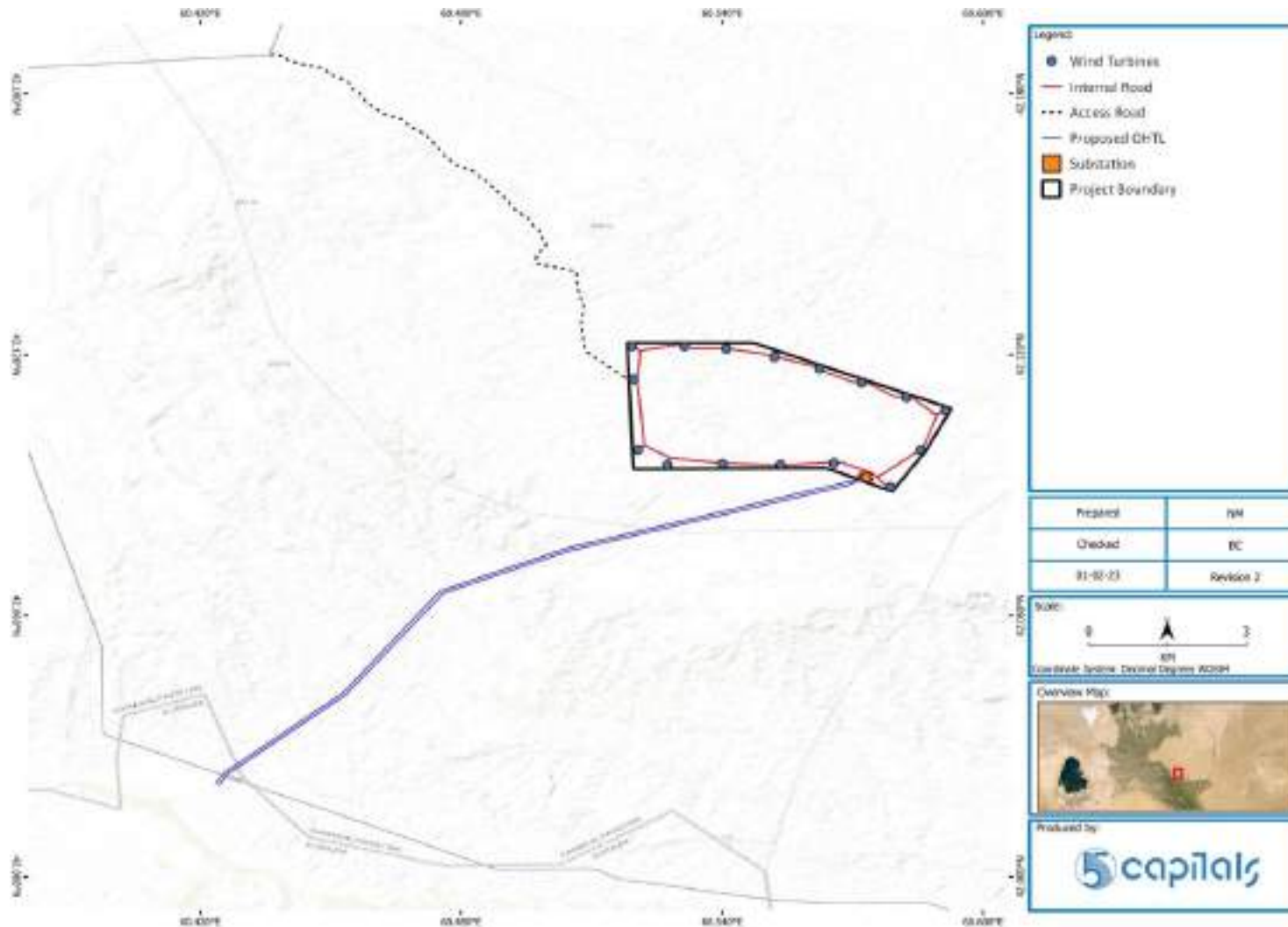


Figure 2-2 Project Location – Local Context

## 2.3 Land Use and Site Condition

### 2.3.1 Land Ownership

According to the 1998 Land Code of the Republic of Uzbekistan, all land in Uzbekistan is state property and permits for use of land are granted and monitored by the State through the rayon and oblast administrations.

The Land Allotment Order will be granted to JSC National Electric Grid of Uzbekistan (NEGU), who will sign a Land Lease Agreement (LLA) with the Project Company<sup>1</sup>.

### 2.3.2 Land Use and Site Condition

#### WIND FARM SITE

The site comprises semi-complex terrain composed of gentle ridges originating from a higher summit at the edge of the Karatau hills located in the west of the Project area. Land cover mainly consists of sandy ground and desert vegetation such as wormwood.

Juru Energy's ESA site visit (conducted in 2020) observations indicate that the Project site is free from any permanent settlements or receptors, although agricultural activity and shepherd huts used on an intermittent basis were observed. Similar site conditions were observed by 5 Capitals and Juru Energy during the site visit in December 2021, although no agricultural activities (i.e., presence of herders) were observed in the site boundary allotted for the WTGs.



**Figure 2-3 General View of Wind Farm Site**

<sup>1</sup> It is important to note that the President of the Republic of Uzbekistan signed a Decree No. UP-6243 "On Measures to Ensure Equality and Transparency in Land Relations, Reliable Protection of Land Rights and Transforming them into a Marketable Asset" dated 08 June 2021. The Decree envisages changes in the land allotment procedure in Uzbekistan from 01 August 2021. The LLA has been preliminary updated to ensure compliance with the Decree No. UP-6243. However, since the Decree does not contain a detailed procedure for implementation of changes in land allotment and only provides for the relevant amendment of the Land Code of Uzbekistan and other related legal acts at the release of the LLA, the LLA is subject to review and update once the amendments to the Land Code and other related legal acts are adopted.

## ACCESS ROAD

The route of the proposed access road is currently a sand track which is assumed to be used primarily by the herders in the surrounding areas. There are no other foreseeable road users in the area and the track does not provide linkage between settlements or access to other infrastructure or points of interest. A typical view of the access road track is shown in the following figure. During the site visit no other vehicles were observed to be using the access road track.



**Figure 2-4 Typical Access Road Conditions**

## OHTL

The OHTL route, moving away from the site, first passes through greenfield land similar to that of the land allotted for the WTG turbines, however, as it passes south over the Karatau hills it passes near to existing industrial facilities before connecting to the national grid close to the A380. The OHTL passes over several dry riverbed crossings, however, no settlements or agricultural land.

## 2.4 Potential Receptor Identification

### 2.4.1 Existing Potential Receptors

The Project site is undeveloped and located more than 10 km from the nearest permanent residential receptors and communities. Potential cultural, industrial and social receptors have been identified through a combination of site visits and desktop review. The following figure outlines their locations relative to the Project and the following table describes the receptors in further detail.

It is important to note that are different areas of influence for different types of receptors. For example, the cultural receptor of Chilpak Kala (C-1) is located 40 km from the wind farm site, however, it has still been considered as a potential visual receptor due to the fact that tourists and visitors would have extensive views from this elevated location. Whereas the area of influence for residential receptors is not considered to be 40 km. Further description and definitions for area of influence are provided in the relevant chapters.

In addition to the receptors shown in the following image and table, general receptors such as 'local populations' and 'A380 road users' will be included and assessed in the relevant chapters. Please note that ecological and physical environment receptors (i.e., soil quality) have also not been included in the following table.



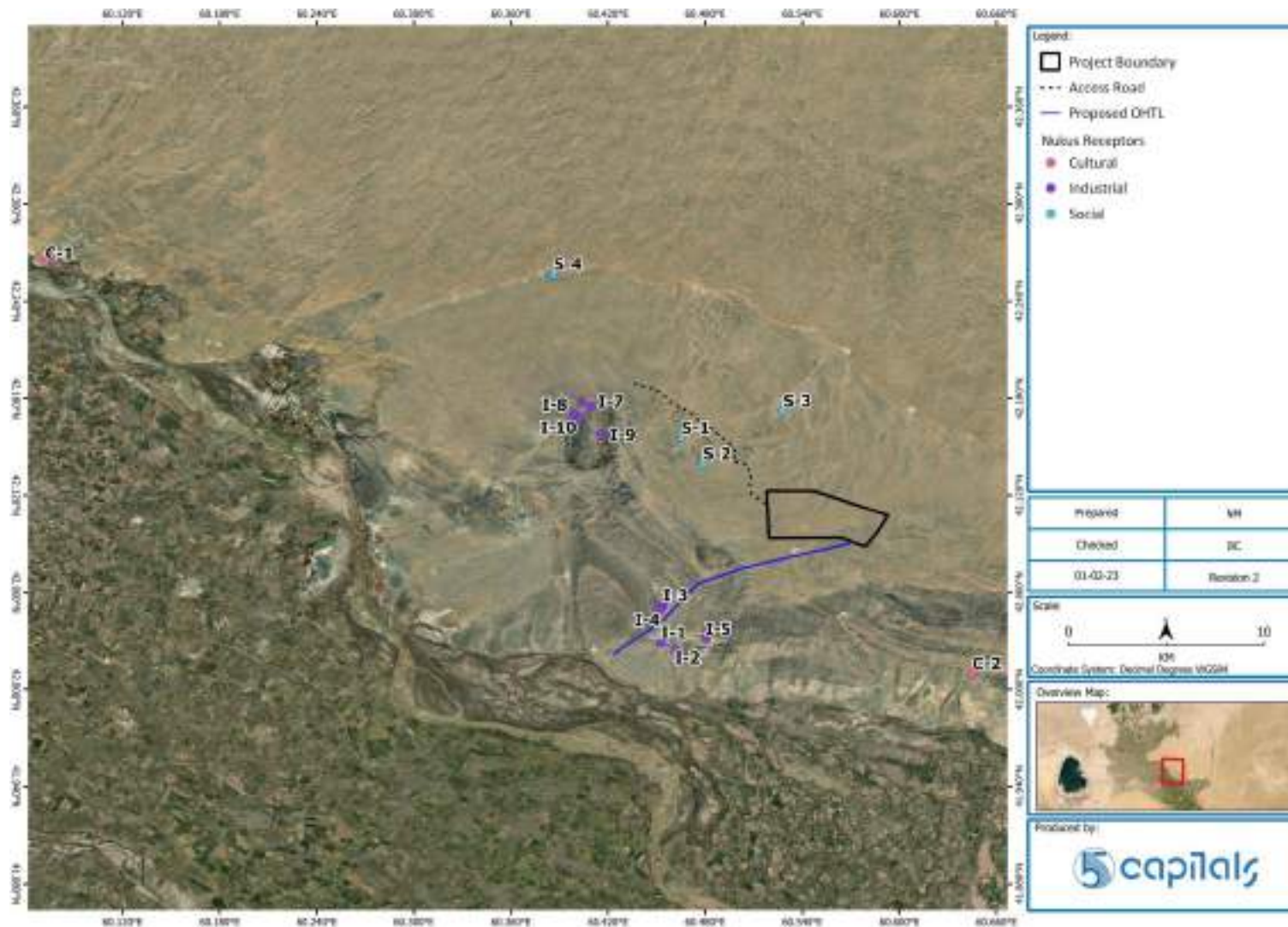






Figure 2-5 Cultural, Industrial and Social Receptors

**Table 2-2 Existing Receptors**

ID	RECEPTOR NAME	PROXIMITY TO PROJECT	DESCRIPTION	IMAGES
S-1	Summer Settlement	5.6 km from wind farm site boundary  1.4 km from access road	Evidence of previous activity (such as ovens and ground markings from a tent) was observed during the December 2021 site visit. Following communication with the herder it was understood that this area was previously used as an area for shelter in summer. In numerous subsequent visits, including in April 2022, no activity has been noted at this location.	
S-2	Guard House for Meteorological Mast	3.8 km from wind farm site boundary  1.9 km from access road	The herder stated that the shelter was built to guard the meteorological mast that is located adjacent and that this shelter is not used for residential purposes.  The mast is no longer operational and in subsequent visits the shelter has been abandoned and is no longer in use.	

ID	RECEPTOR NAME	PROXIMITY TO PROJECT	DESCRIPTION	IMAGES
S-3	Winter Settlement	<p>5.5 km from wind farm site boundary</p> <p>3.9 km from access road</p>	This shelter is understood to be frequently occupied by the herder and his family when they are not at their permanent home in Beruniy.	
S-4	Shelter	<p>18.4 km from wind farm site boundary</p> <p>8.6 km from access road</p>	During the April 2022 site visit the herder was met at this shelter.	-
I-1	Karakalpak Cement LLC Facility	1 km from OHTL route	The Karakalpak and Titan Cement factories are situated along the A380 road, around 9 km south of the wind farm site but relatively close to the proposed OHTL route.	
I-2	Titan Cement LLC Facility	1.9 km from OHTL route		
I-3	Mining area for Karakalpak Cement LLC	0.7 km from OHTL route		
I-4	Mining area for Karakalpak Cement LLC	0.6 km from OHTL route		






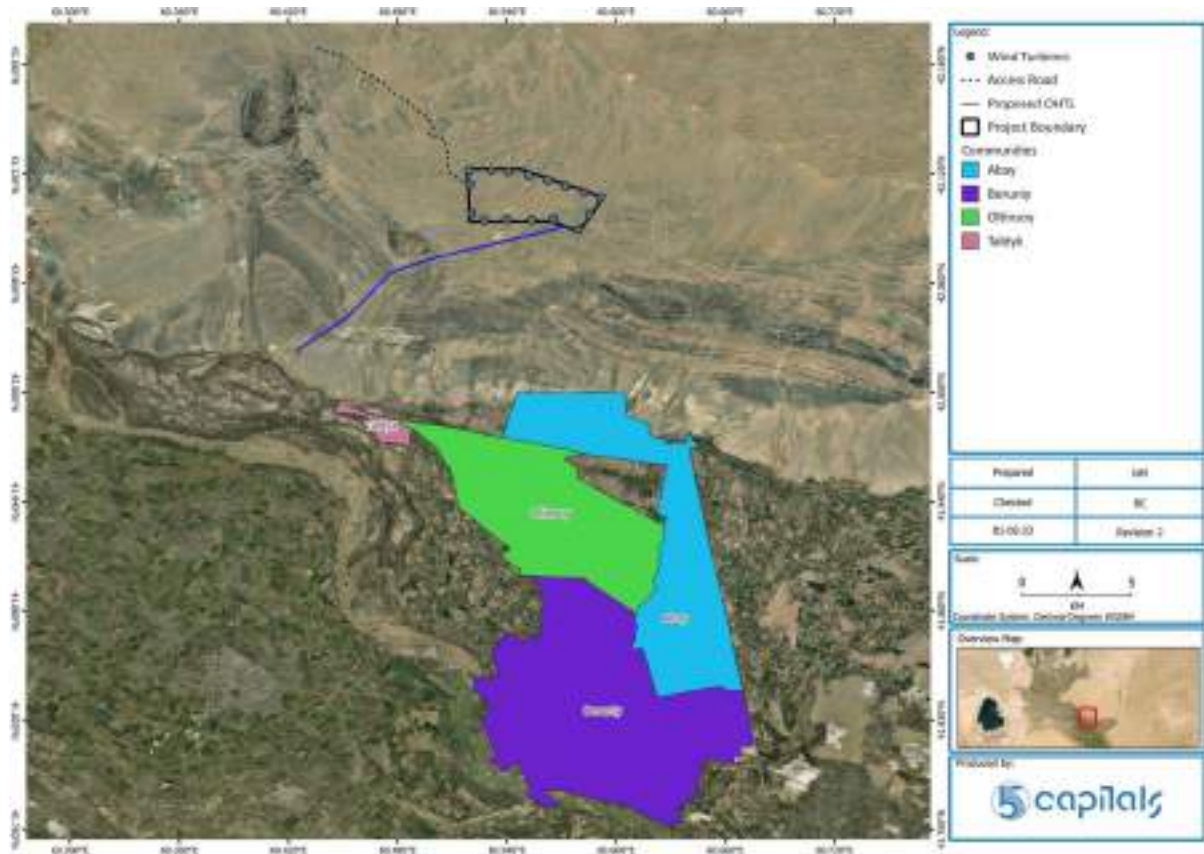
ID	RECEPTOR NAME	PROXIMITY TO PROJECT	DESCRIPTION	IMAGES
			side of the proposed OHTL route.	
I-5	Mining area of Kungrat Sodium Plant	2.5 km from OHTL route	A mining area for a Sodium plant located in Kugrat city, over 200 km from the Project.	-
I-6	FE Tebinbulak Metals LLC	3 km from access road	I-7 to I-10 are active vermiculite mines, whereas I-6 is exploration work to determine the feasibility for further mining work in the area. The exploration work includes geotechnical surveys and numerous subcontractors are currently active at site.	
I-7	Boston Talk LLC	2.7 km from access road		
I-8	Triumf Vermiculite LLC	3.7 km from access road		
I-9	Sverxbelproekt LLC	3.9 km from access road		
I-10	Nanolgreys LLC	3.7 km from access road		

Image of I-7.

ID	RECEPTOR NAME	PROXIMITY TO PROJECT	DESCRIPTION	IMAGES
C-1	Chilpak Kala monument	40 km from wind farm site boundary	<p>Visitors to the cultural heritage monument may have a distant view of the Project.</p> <p>Details of the monument are provided in Chapter 15.</p>	
C-2	The Sultan Uwais Baba Complex	10 km from wind farm site boundary	<p>Visitors to the cultural heritage site may have a distant view of the Project.</p> <p>Details of the complex are provided in Chapter 15.</p>	

## 2.4.2 Local Communities

The closest communities to the Project are Abay, Beruniy, Altinsay (Oltinsoy) and Taldyk. Their proximity to the Project is shown in the following figure, with further details with regards to their distance provided in the following table.



**Figure 2-6 Local Communities**

**Table 2-3 Proximity of Local Communities**

COMMUNITY NAME	PROXIMITY TO NEAREST WTG	PROXIMITY TO CLOSEST PROJECT ASSET
Taldyk	13 km	3.5 km to OHTL
Altinsay	13 km	6 km to OHTL
Abay	10 km	10 km to OHTL
Beruniy	12 km	17 km to OHTL

### 2.4.3 Planned and Potential Developments

#### 2.4.3.1 Wind and Mining Projects

The surrounding region has been selected as an area of potential for developing wind and mining projects.

The GOU is contemplating development of a 200 MW wind project in the Karatau mountain range adjacent to the site. The specific area reserved for the potential 200 MW wind project is located east of the site. A 1,500 m wide buffer area would be defined between the Project and the potential 200 MW wind project, however, the potential 200 MW wind project may connect to the Project's substation.

The 200 MW wind project will be procured through a separate process and is not included within the assessment of the Project, however, reference is made within the Cumulative Impact Assessment of this Report.

In addition, areas adjacent to the Project are allocated for future mining exploitation with the mineral rights currently owned by the State. However, Juru Energy (2021) state *"following discussions with the State Committee on Industrial Safety of the Republic of Uzbekistan, dated 12/05/2020 it is understood that the mining areas are not actively earmarked for exploitation at this time."*

The locations of potential future wind and mining projects are shown in the following figure. It is noted that the OHTL and access road pass through areas allocated as potential future mining areas, however, the Project layout and location of future potential projects was provided in the tender documentation of the Project by the GOU.

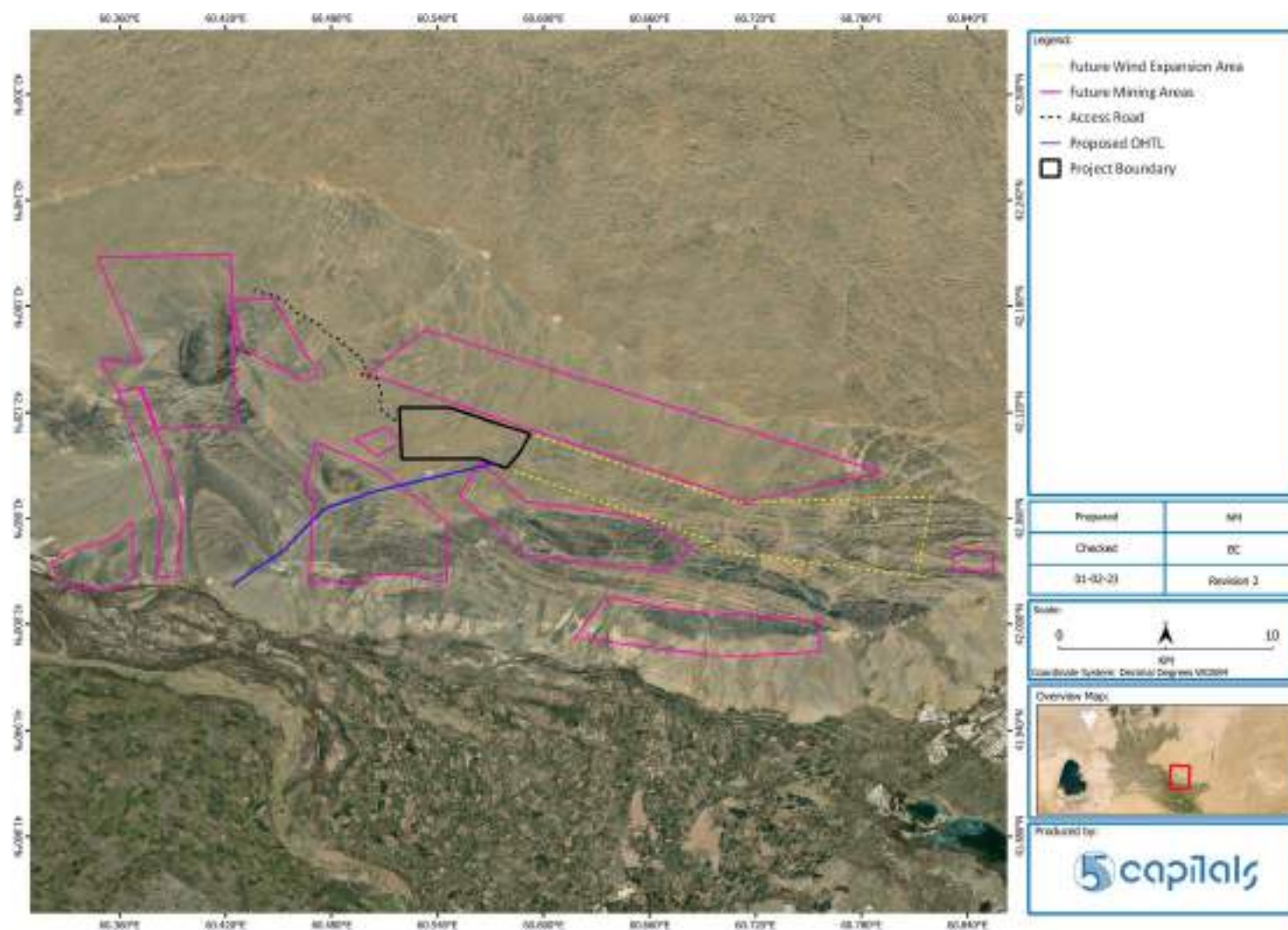
#### 2.4.3.2 Karatau Metal Processing Plant

A Karatau Processing Plant is scheduled to open in 2024 and the development of the plant includes a phased expansion of Karatau town. Current plans indicate the population of Karatau will increase from 3021 in 2019, to 5300 in 2041; and the town footprint will expand from 127 ha to 204 ha by 2041. Based on discussion with the administrative representative in Karatau and review of Presidential Decree 3473 (12 January 2018), the metal processing plant will generate up to 2000 jobs.

#### 2.4.3.3 Solid Waste Management Facilities

It is understood that new solid waste management facilities will be developed in Nukus province, although locations have not been specified.





**Figure 2-7 Potential Future Projects**

## 2.5 Project Description

### 2.5.1 Wind Turbines

Wind turbines harness the energy of the wind and convert it to electricity. The amount of energy produced by wind turbines increases with wind speed and modern turbines are able to adapt efficiently to extract energy from a range of wind speeds.

Wind speeds typically increase with height above ground as turbulence (due to topography and ground features) intensity decreases. This typically allows turbines with higher hub heights to produce more energy than a turbine with a lower height at the same location. In addition, longer blades (the rotor radius from the turbine) significantly increase the swept area from which wind energy can be extracted.

The Project consists of 16 WTGs, located along the edges of the allotted site boundary. All 16 WTGs will be the same specification and will be Envision EN171 6.5 MW Model with the following specifications. The appearance of the WTG is shown in the following figure.

**Table 2-4 WTG Specifications**

<b>WTG MODEL</b>	Envision EN171 6.5 MW
<b>CAPACITY</b>	6.5 MW
<b>BLADES</b>	3
<b>HUB HEIGHT</b>	120 m
<b>ROTOR DIAMETER</b>	171 m
<b>SWEPT AREA</b>	22,965 m <sup>2</sup>
<b>CUT-IN WIND SPEED</b>	3 m/s
<b>CUT-OUT WIND SPEED</b>	25 m/s
<b>MAXIMUM WIND SPEED (10 MIN AVERAGE)</b>	42.5 m/s
<b>DESIGN LIFETIME</b>	25 years



**Figure 2-8 WTG Appearance (Envision, nd)**

The locations of the WTGs are shown in the following figure.

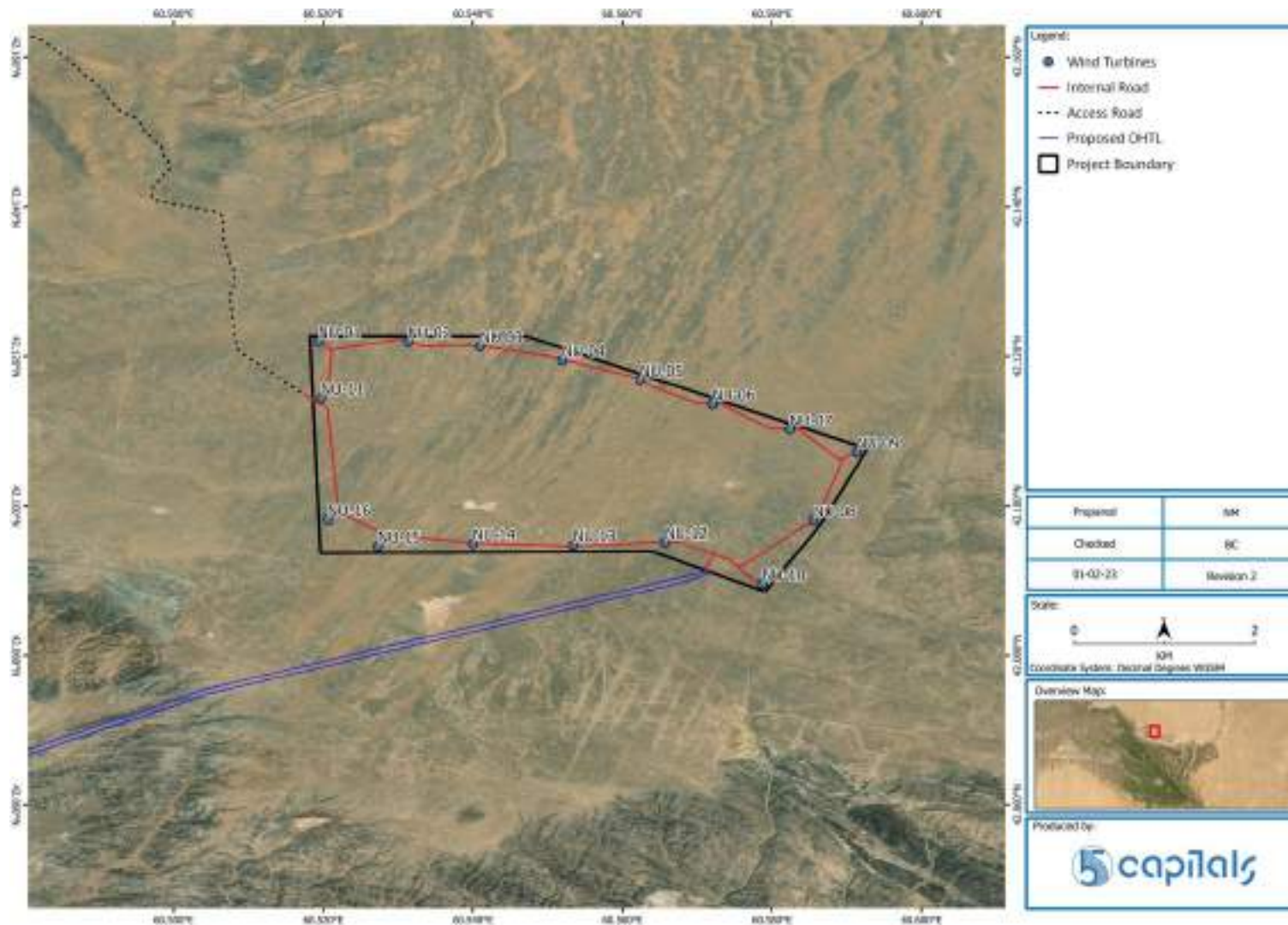


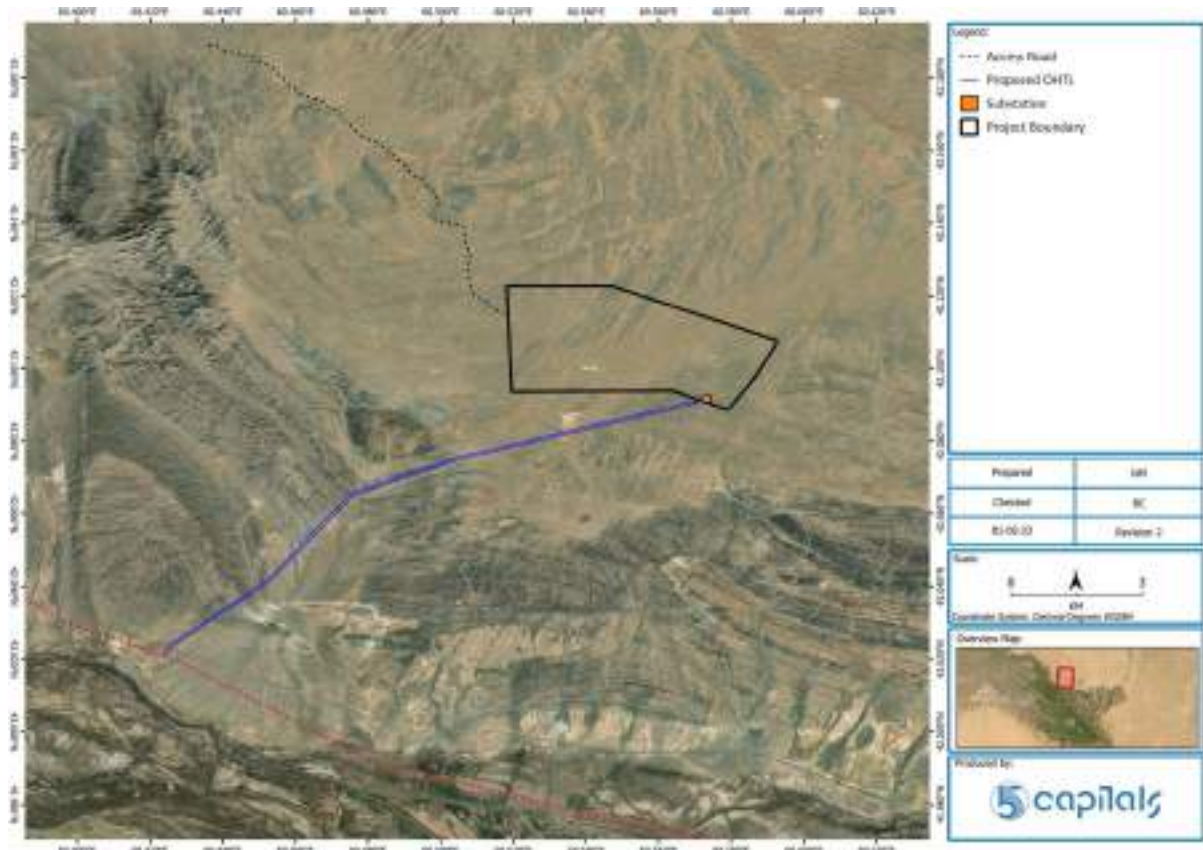
Figure 2-9 Project Layout



## 2.5.2 Project Facilities

### POWER EVACUATION INFRASTRUCTURE

The power evacuation infrastructure includes a switching station (substation) and OHTL route of approximately 16 km length. The OHTL will connect to the national grid at the interconnection point on the existing OHTL 220 kV Takhiatash substation – Khorezm substation.



**Figure 2-10 Power Evacuation Infrastructure**

### ACCESS ROAD

The site is separated from roads and the regional highway (the A380) by the Karatau hills. The Project includes the design and construction of an access road connecting the site to the local road, referred to as '4P190' which will connect to the A380 to the settlements Aimbed-Ishan and Karauzak to the north. The access road shall be approximately 13 km in length and will be mostly gravel, unless local strengthening is required.



### 2.5.3 Operations and Maintenance Facility

The Project will include an Operations & Maintenance (O&M) building, which will be part of the substation and therefore there will be no additional land take for this facility. The O&M building will be used to:

- Provide security to the Project
- Support the operation of the Project
- Store spare parts
- Management wastes produced at the Project.

## 2.6 Project Construction

### 2.6.1 Construction Activities

The principal construction activities and associated requirements in relation to the wind farm are anticipated to include the following;

- Transportation of components to the Project site;
- Delivery of machinery & equipment to the site;
- Construction of temporary laydown facilities and building site equipment (e.g. containers at the Project site);
- Site preparation (comprising excavation, grading, levelling, and land clearing at WTG platforms) to create flat land area for preparation of turbine pads, installation of wind turbine towers and various project components;
- Additional facilities to facilitate construction work (comprising excavation and levelling etc.) for access road and the internal road network, construction of any building infrastructure (if required);
- Provision of electricity supply, generation and distribution system as required for installation;
- Erection of WTGs;
- Commissioning tests of electrical infrastructure (including WTGs) and inspection of civil engineering quality records.

Principal construction activities for the OHTL and access road are anticipated to include:

- Site preparation (comprising excavation, grading, levelling, and land clearing at tower footprint, OHTL corridor and access road alignment);
- Transportation and delivery of equipment/machinery and OHTL components;
- Construction of platforms for pylons/towers and delivery of materials along OHTL route;

- Assembly of OHTL towers/pylons;
- Construction of the substation;
- Installation & erection of OHTL towers/pylons, installation and laying of wires & transmission cables on pylons, connecting wires and cables, stringing of conductors, tensioning and sagging of conductors;
- Construction of gravel access road and local strengthening if required and
- Provision of electricity supply, generation and distribution system as required for installation, erection, etc.

### 2.6.2 Laydown Areas

Temporary construction laydown areas will be established within the site boundary of the land allocated for the WTGs. After completion of construction, the construction laydown areas will be disassembled, and the area will be returned to its original condition. The laydown area will include:

- Office containers;
- Storage areas for equipment;
- Parking areas;
- Bathroom and waste collection facilities;
- Equipment for power generation;
- Communications equipment; and
- Other miscellaneous small items as required.

It is understood that the majority of turbines will have a dedicated laydown area, and in addition there will be a main laydown area, the location of which is shown on the following figure shown on the following figure. A batching plant will also be located in this area.

The laydown areas for OHTL construction are not yet confirmed

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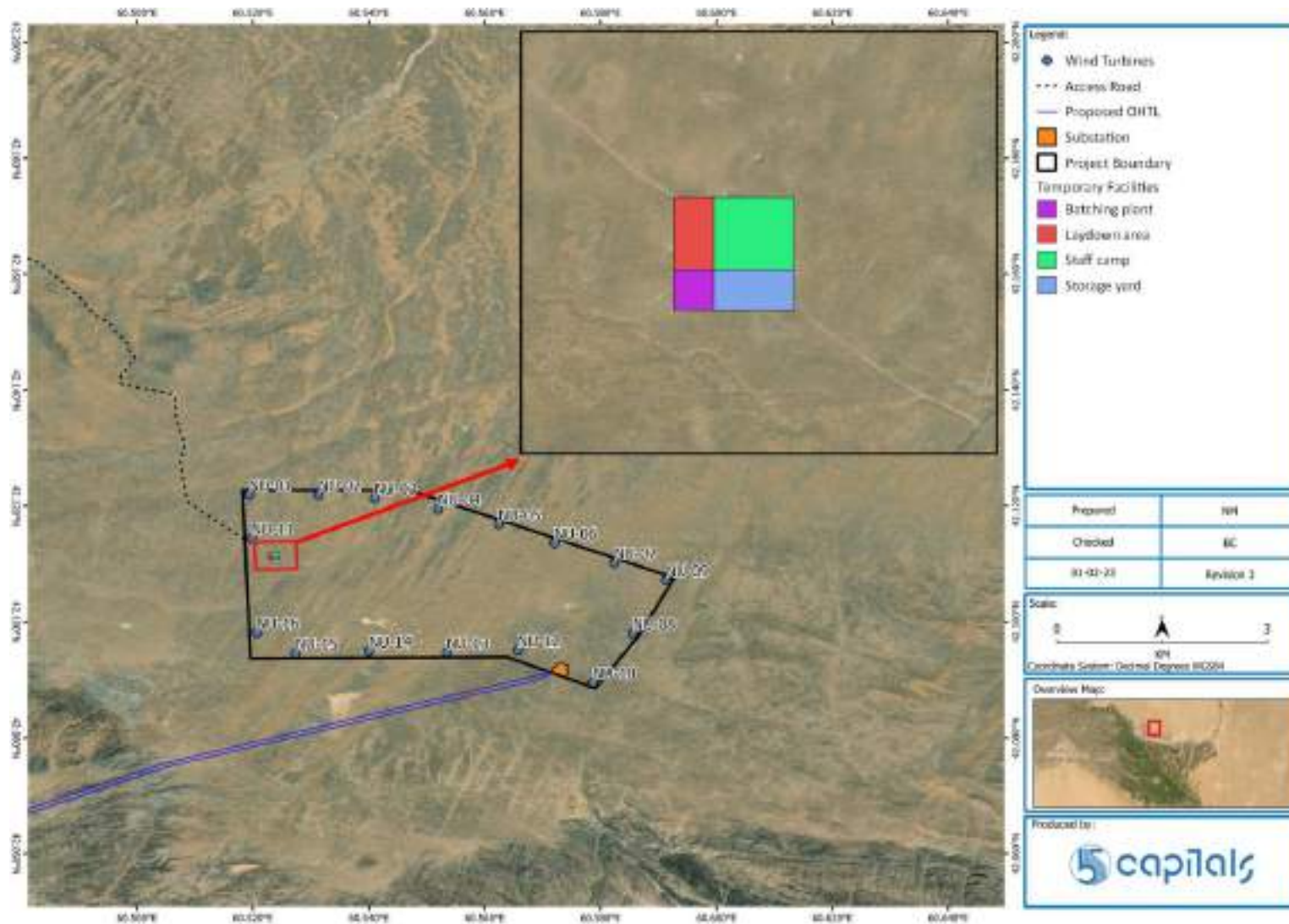


Figure 2-11 Laydown Areas

### 2.6.3 Construction Workforce and Accommodation

It is estimated that the construction workforce will comprise 150 people and it is understood that the workers' accommodation will be located within the main laydown area as shown previously. The accommodation will align with the IFC & EBRD Workers Accommodation: Processes and Standards (2009) document.

Based on experience from other construction sites, this accommodation is expected to be dedicated for EPC Contractor and possibly Project Company and other specialist staff. It is likely that the sub-contractors, if necessary, will need to arrange for alternative accommodation facilities for their workers, which may also be on, or off-site. Sub-contractor accommodation (on and/or off-site) will also align with the Project standards for worker accommodation.

### 2.6.4 Utilities & Waste

#### **ELECTRICAL SUPPLY & FUEL**

Due to the isolated nature of the Project site, the use of temporary diesel generators will be required during construction. Although unconfirmed at this stage, it is expected that each contractor will supply its own generators.

It is expected therefore that the EPC Contractor and any sub-contractors will have their own diesel storage facilities on-site, which are expected to receive fuel from tanker delivery.

#### **WATER SUPPLY**

The Project will require both potable and non-potable water supplies for the construction phase. A licensed water supply company will supply the water required to cover the water demand of the Project to the site via water tanker trucks.

It is understood that water will be delivered to the site by the EPC Contractor. In this case, water tanker trucks will transport water from outside the Project site to water storage tanks within the Project boundary to cover the water demand of the Project which will include potable water demand, raw water demand, firefighting water demand and service water distribution.

Based on IFC and EBRD Guidance on Workers' Accommodation, 80 to 180 litres (l) per person per day will be available (based on weather conditions). The maximum number of workforce is expected to be 150 workers and assuming an average of 130 l (benchmarked against estimated number for similar WF projects in the region), the Project would require 19,500 l/day (19.5 m<sup>3</sup>/day) to cover the needs of the workforce.

## Water Requirements for Concrete Works

The following table outlines the water consumption estimates per WTG for different construction activities. The estimates are based on experience on wind projects in the region. Water will also be required for the substation base, dust suppression etc.

**Table 2-5 Water Consumption Estimates**

ACTIVITY	MAXIMUM WATER REQUIREMENT PER WTG (m <sup>3</sup> )
WTG Foundation Pouring	90 m <sup>3</sup> per WTG foundation, as it is assumed that the size of the foundation is approximately 750 m <sup>3</sup>
WTG Foundation Curing	1 m <sup>3</sup> per WTG foundation per day assuming 10 days will be sufficient for foundation curing
WTG Components Cleaning before Erection	2 m <sup>3</sup> per WTG

## WASTES

Wastes will be generated throughout the construction period. Waste streams will include excavation wastes, packaging wastes, domestic waste from construction workforce etc. Wastes will be segregated and stored onsite before being collected when required by a licensed waste management contractor. Refer to Chapter 13 for further details regarding waste streams and management.

## WASTEWATER

Domestic wastewater will be generated from toilets on-site, as well as any canteen/catering activities. Wastewater will be stored in septic tanks and collected when required by a licensed wastewater management contractor. No sewage treatment activities will be undertaken on-site.

Refer to Chapter 13 for further details regarding wastewater management.

## 2.7 Project Operation and Maintenance

As per the Power Purchase Agreement (PPA), the Project lifetime is 25 years, the following subsections discuss operation and maintenance activities, and Section 2.9 discusses the decommissioning / transfer of the Project after completion of the 25 years.

### 2.7.1 Activities

Wind farms generally require limited operational activities and typically include the following:

- Operation and maintenance to include normal daily operation of equipment including maintenance (electromechanical and housekeeping) to optimise energy yield and life of the system;

- Remotely activated turbine shutdown during excessive wind speeds; and
- Routine planned preventative maintenance and unplanned maintenance (if required).

### 2.7.2 Workforce

The operational period is expected to require a permanent workforce of 10 – 15 with up to 5 temporary employees.

The Project will not require shifts and the working period of all employees will be 8 hours, shifts are not required as the site can be remotely supervised by SCADA and employees will be on-call if required.

### 2.7.3 Utilities and Waste

#### **ELECTRICAL SUPPLY AND FUEL**

The operational buildings will be fed from the Project auxiliary bus bar, which shall be backed up by an emergency diesel generator, which has a tentative capacity of 300 kW. The electricity will be used to power the operational buildings to ensure security of the site and monitoring of operations.

#### **WATER**

The peak potable water requirement is estimated to be 300 m<sup>3</sup> per month. This water will be used by operational staff for uses such as drinking and cleaning. The process operation of the Project does not require water.

#### **WASTE**

A limited amount of domestic waste shall be produced by the O&M team, and this shall be removed from the site daily.

Wastes from maintenance or repair activities could include spent fuel and chemical containers, oily rags, WTG components. The amount of this type of waste is expected to be negligible. Wastes will be segregated and stored onsite before being collected when required by a licensed waste management contractor. Refer to Chapter 13 for further details regarding waste streams and management.

A septic tank will be constructed for wastewater, the volume of the tank will be determined during detailed design, and it will be emptied as required by a licensed contractor.

## 2.8 Project Milestones

The following table outlines key project milestones.

**Table 2-6 Key Project Milestone/Timeline Dates**

MILESTONE	DATE
Project Award	10 <sup>th</sup> October 2021
Signing of EPC & O&M Agreement	Q4 2022
Project Commercial Operation Date (PCOD)	17 <sup>th</sup> September 2024 Subject to Gov. approval

## 2.9 Decommissioning of the Project

Upon completion of the Project, it shall either be decommissioned or transferred, at the discretion of the GOU.

Potential impacts relating to decommissioning will be similar to those encountered during the construction phase. There are only likely to be a few decommissioning related risks to wind turbines such as minor quantities of hazardous components. Due to the small footprint of the project WTG, all structures and infrastructure could feasibly be dismantled for material recovery.

Given that the decommissioning phase, if chosen by the GOU, will not occur before 25 years from COD, there are no specific requirements for decommissioning at this time, since future environmental and social regulations have yet to be developed. As such, it is not considered practical to speculate on future environmental and social conditions or the sensitivity of current or future receptors at this time. However, high level key risks (e.g., from Project wastes) have been considered within this Report.

It is proposed that the decommissioning process will be managed via an updated ESIA and ESMS to identify measures for the prevention, avoidance or minimisation of impacts. A specific Decommissioning Plan will also be required. The studies should be undertaken at least 12 months prior to the time of decommissioning to reflect changes in regulations and standards, and requirements for compliance with the expected "circular economy" that is likely to be a condition at that time. This will require maximising the re-use, recovery and recycling of components and materials to provide resource for future use.

Where potentially significant decommissioning risks have been identified, these have been discussed at a high level herein, however, as stated previously, decommissioning impacts are expected to be further assessed for appropriate management at a later time in the Project lifecycle.



## 2.10 Project Alternatives

### 2.10.1 No Project Alternative

The GOU, through the Ministry of Energy, aims to increase the electricity production in the country to foster economic growth, develop and expand the use of renewables and develop public-private partnerships in the country's energy sector.

The Project forms part of the Ministry of Energy's plan to develop and expand renewable use to 8 GW and increase total electricity production in the country to 29.3 GW by 2030. The generating capacity of the Project will be 100 MW and this will contribute to the 3 GW estimated wind power contribution to the total renewable power generating capacity.

Given the national strategy for additional renewable energy contribution to the total power generating capacity, a 'No Project' option has not been considered further. This alternative would delay the GOU from meeting its renewable energy target and potentially continue the reliance on non-renewable energy sources.

Upon reviewing the anticipated impacts as a result of the development of the Project, although the construction phase may likely result in potential temporary negative impacts, the operational phase of the project will result in an overall positive impact, particularly due to the socio-economic benefits and the increase in renewable energy being supplied to the Uzbekistan grid.

### 2.10.2 Alternative Project Site

The Project was initially to be located close to the meteorological mast, which is located approximately 4 km west of the Project site boundary. Constraints with respect to mining rights have led to the definition of a reserved zone in which the Project will be designed, built and operated. These constraints made it necessary to shift the Project further away from the location of the measurement mast as originally planned.

If the Project had been developed in the original location, the environment and social impacts are expected to be largely similar, however, the Project would have been closer to the herder's shelters (S-1, S-2 and S-3) and therefore the impacts relating to noise, air quality and shadow flicker are likely to have been more significant and the potential for resettlement increased.

### 2.10.3 Project Technology

Turbines from Goldwind, Envision, Mingyang, Shanghai Electric, Vestas, Siemens Gamesa and Dongfang have all been considered.



The Envision EN171 6.5 model was selected for the current layout and was based on the following criteria:

- Technology options for flexible use and maximising energy generation during high and low wind conditions;
- Least cost of energy which results in highest generation at lowest cost;
- Site suitability of the chosen WTG model; and
- Project schedule.

From an environmental and social perspective, the turbines are essentially the same and will each result in similar impacts. However, one difference will be with respect to supply chain risks.

#### 2.10.4 Project Layout

##### **WTGs**

Initially the Project was to consist of 17 WTGs, however, it was deemed cost and energy effective to have only 16 WTGs. It is considered likely that the reduction in number of WTG would have environmental and social benefits, due to the reduction of transport needed, reduction in required construction effort and the reduction in operational impacts such as noise, shadow flicker and potentially bird collisions. Note that noise, shadow flicker and collision risk modelling have not been undertaken for the previous layout and therefore assumptions that 16 WTGs will result in less significant impacts than 17 WTGs considers only number of turbines and not specifics including siting of turbines.

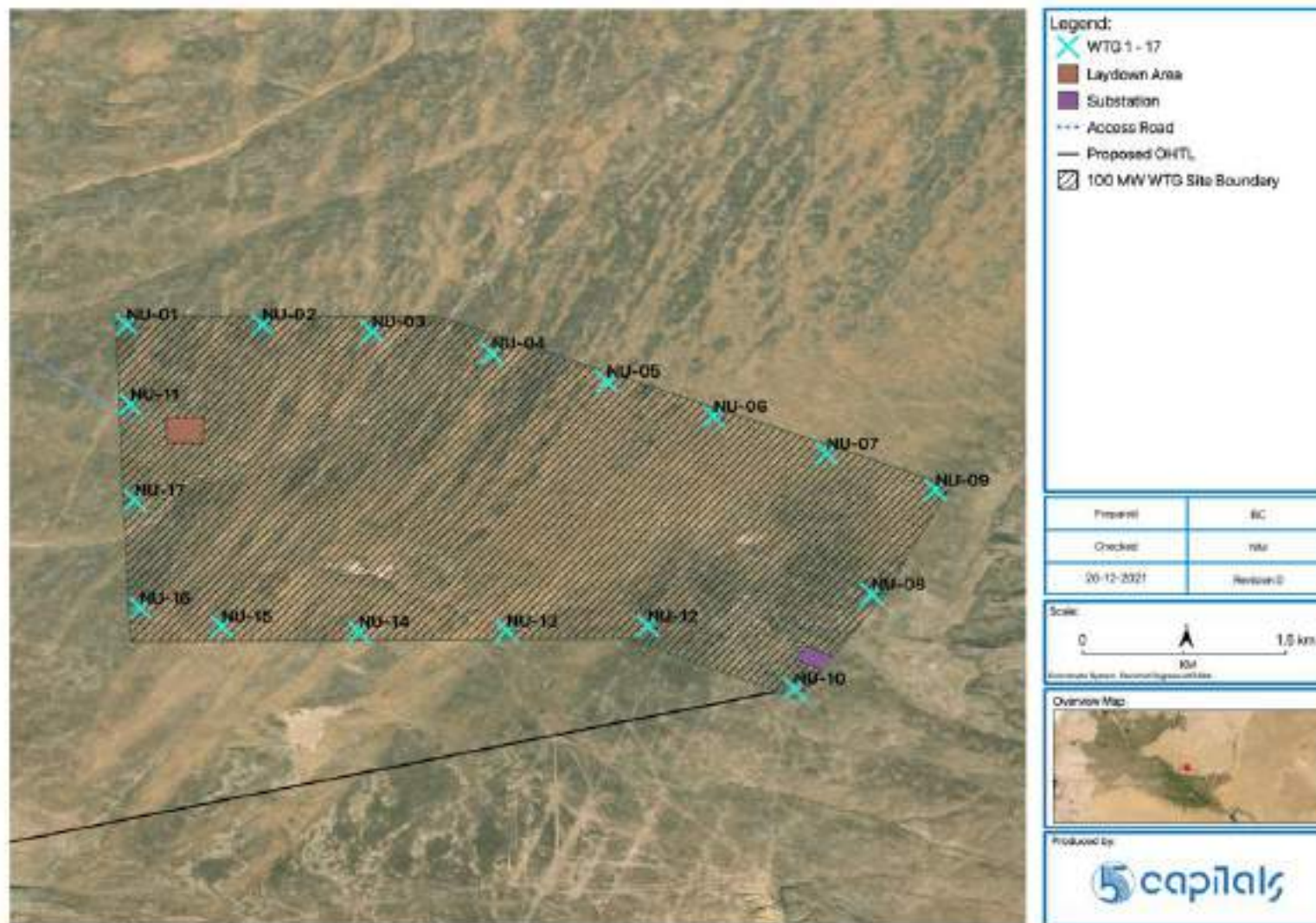


Figure 2-12 Previous Layout

## OHTL ALIGNMENT

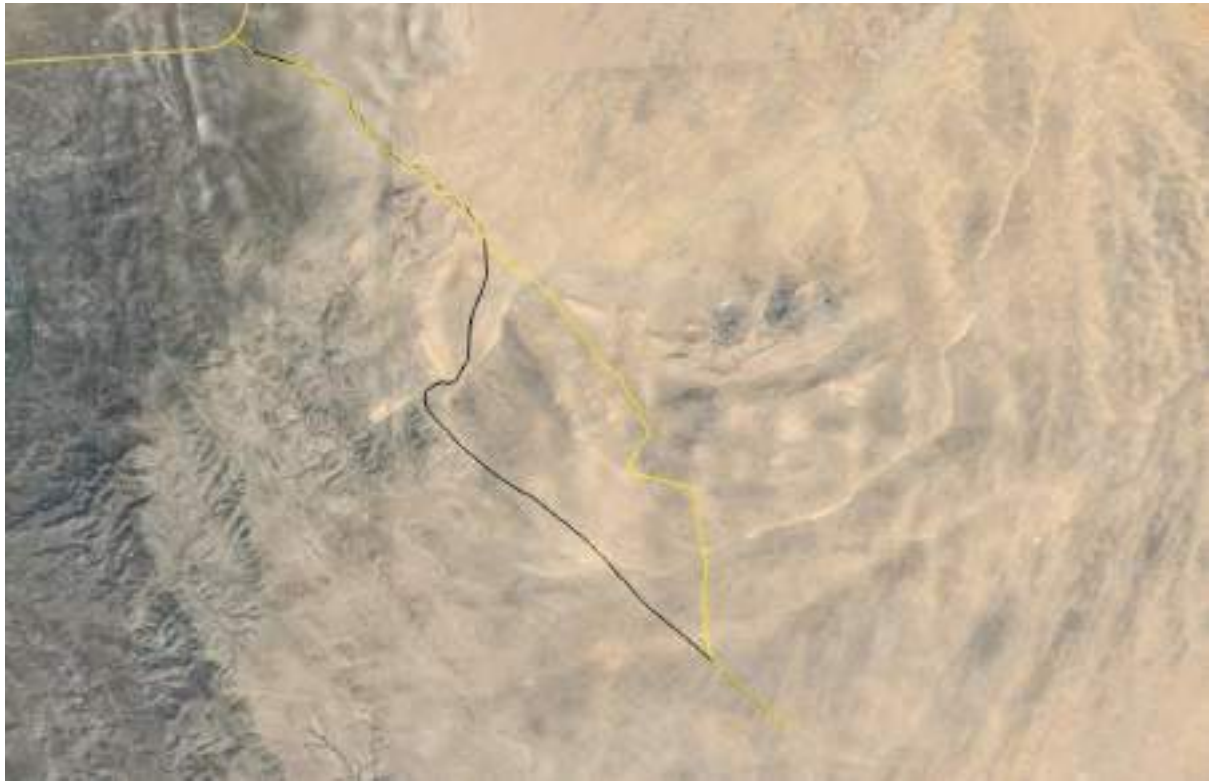
In August 2022, a consultation letter from the State Committee of the Republic of Uzbekistan for Geology and Mineral Resources was received stating that the proposed OHTL intersects with an area that is designated for active geological exportation works, including blasting. Therefore, the OHTL route was amended slightly to avoid such areas. The following figure depicts the differences in OHTL alignments, the black line is the previous layout, and the green is the Project layout.



**Figure 2-13 OHTL Layout Differences**

## ACCESS ROAD

The access road alignment has also developed since the Project's inception. The following figure depicts the difference in access road route with the black line the original route and the yellow line the Project's access road alignment.



**Figure 2-14 Access Road Differences**



## 3 REGULATORY FRAMEWORK

### 3.1 National Regulations

#### 3.1.1 Constitution of Uzbekistan

The constitution of Uzbekistan has the following provisions relating to environmental aspects:

- Article 50: All citizens shall protect the environment.
- Article 54: Any property shall not inflict harm to the environment.
- Article 55: Land, subsoils, flora, fauna, and other natural resources are protected by the state and considered as resources of national wealth subject to sustainable use.

#### 3.1.2 Uzbekistan Policy Framework for Wind Projects

The primary legislation for the development of the Wind Energy Projects is the Law of the Republic of Uzbekistan No. 537 "On Public-Private Partnership" dated 10<sup>th</sup> May 2019 and the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 259 "On Improving the Procedure for Implementing Public, Private Partnership Projects" dated April 26, 2020.

The Law of the Republic of Uzbekistan No. 539 "On the Use of Renewable Energy Sources" (RE Law) dated May 21, 2019; and the Law of the Republic of Uzbekistan No. 412-1 "On the Rational Use of Energy" dated April 25<sup>th</sup>, 1997 will also be applicable to the Project.

In October 2019, Uzbekistan issued an environmental strategy: Uzbekistan's Environmental Strategy 2030 (approved by the Decree of the President of the Republic of Uzbekistan No. 5863 dated October 30<sup>th</sup> 2019) which promotes renewable energy development.

The Strategy also contains measures to preserve the environment (air, water, land, soil, biodiversity etc) from anthropogenic impacts and other negative factors, expand protected areas and improve the environmentally safe systems of waste management.

#### 3.1.3 President Decree № PD-4477 on the Strategy for the Transition of the Republic of Uzbekistan to a Green Economy in the period 2019-2030

This decree was adopted to fulfil Uzbekistan's obligations under the Paris Climate Agreement signed on April 19, 2017 and to implement the Action Strategy for five priority areas of development for 2017-2021.

This decree sets out a strategy for the transition of the Republic of Uzbekistan to a green economy for the period 2019-2030, aimed at improving energy efficiency, rational

consumption and conservation of natural resources, reducing greenhouse gas emissions, providing access to green energy, creating green jobs and ensuring climate sustainability. It sets several targets for this transition, including the further development of renewable energy sources, covering over 25% of total electricity generation.

### 3.1.4 Law on Nature Protection, 1992 as Amended in 2019

This law is the key national environmental law for the protection of the environment and the sustainable use of resources and the right for the population to a clean healthy environment. This law states legal, economic, and organisational basis for the conservation of the environment and the rational use of natural resources. Article 25 of this law states that the State Environmental Expertise (SEE) is a mandatory measure for environmental protection, preceded to decision making process. In addition, the law prohibits the implementation of any Project without approval from SEE.

### 3.1.5 Law on Environmental Control, 2013

The main objectives of this law include:

- Prevention, detection and suppression of violation of legislative requirements relating to environmental protection and rational use of natural resources.
- Monitoring the state of the environment, identifying situations that can lead to environmental pollution, irrational use of natural resources, pose a threat to the life and health of citizens.
- Determination of compliance with environmental requirements of any ongoing economic development activities.
- Ensuring compliance with the rights and legitimate interests of legal entities and individuals performing their duties in relation to environmental protection and sustainable use of natural resources.

### 3.1.6 Environmental Audit Law No. ZRU-678, 2021

The Environmental Audit Law was adopted to regulate environmental audits in the field of environmental protection and rational use of natural resources, including voluntary or mandatory environmental audits. The Law states that *'an environmental audit can be carried out on a voluntary form by businesses with low or insignificant (local) risk of environmental impact and on a mandatory form on an annual basis for businesses with high and medium risk of environmental impact'*.

An environmental audit is not a substitute for environmental control; however, in case of a positive conclusion of the audit, a business entity is not subject to an inspection by the State Committee on Ecology and Environmental Protection for one year, except for accidents and

emergencies, as well as in connection with the investigation of criminal cases or by order of the President of the Republic of Uzbekistan or the Cabinet of Ministers of the Republic of Uzbekistan. The environmental audit is carried out on the basis of a contract concluded between the environmental auditing organisation and the client of the environmental audit. The Law comes into force in March, 2022."

### 3.1.7 Law on the Rational Use of Energy, 1997

This law is fundamental to the development and functioning of the whole energy sector, including renewable energy. It defines a general legal framework to ensure the conservation of national energy resources and the efficient use of the available production capacity, fuel and energy. The law provisions are applicable to legal entities and individuals whose activities are related to the extraction, production, processing, storage, transportation, distribution and consumption of fuel and energy.

The law is aimed at achieving the following objectives:

- Ensuring efficient and environmentally friendly use of energy in its production and consumption;
- Ensure reliability, uniformity of measurements and metering of quantity and quality of energy production and consumption
- Governmental control and supervision over efficient energy production and consumption, its quality, the technical condition of energy equipment, energy supply systems and energy consumption.

The law has a particular article that defines the framework conditions for the use of renewable energy sources and aims to stimulate the development of renewable energy in Uzbekistan. The law authorises independent producers of electricity and heat from renewable energy sources to supply energy to the energy networks of energy supply organisations, which are obliged to accept energy from these producers at prices formed according to the established procedure. The prices are formed by an authorised body, currently the Ministry of Finance of the Republic of Uzbekistan.

### 3.1.8 Presidential Decree No. 5863 on Environmental Protection Strategy, 2019

The Strategy contains measures to preserve the environment (atmospheric air, water, land, soil, subsoil, biodiversity, protected areas) from anthropogenic impact and other negative factors, expand protected areas, and improve the environmentally safe system of waste management.

The Strategy approved 24 target tasks until 2030, which aim to increase the area of forest plantations, restoration and reclamation of disturbed lands, rational use of water resources,

reduction of emissions into the air, protection and reproduction of biological resources, and improvement of the waste management system.

Through the implementation of the Strategy, the following are expected to be achieved:

- Increasing the area of forest plantations on the Uzbek part of the dried Aral Sea bed from 28% (0.9 million ha) to 60% (2 million ha);
- Reduction of pollutant emissions by 10% (from 2.492 million to 2.243 million tonnes);
- Converting 80% (about 6,500) of public transport to natural gas and electric propulsion;
- Increasing the area covered by forest from 3.2 million to 4.5 million hectares;
- Increasing the area of protected areas from 3.5 percent (1.5 million hectares) to 12 percent (5.4 million)
- Increasing the coverage of solid domestic waste collection and transportation services from 48% (16 million people) to 100%;
- Increasing solid domestic waste processing from 18% (1.3 million tonnes) to 65% (4.6 million tonnes).

Other relevant national laws and regulations to the Nukus 100 MW Wind Farm project include:

#### ENVIRONMENT

- The Law of the Republic of Uzbekistan "On water and water use" (1993) as amended in 2019.
- The Law of the Republic of Uzbekistan "On Ecological Expertise" (2001) as amended in 2017.
- The Law of the Republic of Uzbekistan "On Protection and Use of Vegetation" (1997) as amended in 2016.
- The Law of the Republic of Uzbekistan "On Protected Natural Reserves" (2004) as amended in 2019.
- The Law of the Republic of Uzbekistan "On Protection and Use of the Wildlife" (1997) as amended in 2016.
- The Law of the Republic of Uzbekistan "On Wastes" (2002) as amended in 2019.
- The Resolution of the Cabinet of Ministries of the Republic of Uzbekistan №541 "On further improvement of the environmental impact assessment mechanism".
- The Resolution of Cabinet of Ministries of the republic of Uzbekistan №820 "On measures to further improve the economic mechanisms for ensuring nature" dated on 11th October, 2018.



- The Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No 14. "On approval of the regulation on the procedure for the development and agreement of projects with environmental standards".
- Law "On Environmental Expertise" No.73-II of 25.05.2000 (as amended on 22.11.2018).
- The Law of the Republic of Uzbekistan "On Atmospheric Air Protection" (1996, amended on 13.03.2019)
- Resolution of Cabinet of Ministers of Republic of Uzbekistan No.95 "On approval of general technical regulations of environmental safety" (2020).

#### **LABOUR AND EMPLOYMENT**

- Ordinance No. 30-31 of the Ministry of Labour and Social Security and the Ministry of Health of the Republic of Uzbekistan approving the list of hazardous jobs mentioned in Article 355, for which the employment of persons under the age of eighteen years is prohibited
- Joint Decree of the Ministry of Labour and Social Protection of the Population (No. 7) and the Ministry of Healthcare (No. 1) of Uzbekistan dated 30 May 2001 to approve the list of occupations with unfavourable working conditions to which it is forbidden to employ persons under 18 years of age.
- Decree No. 133 of 11 March 1997 to approve normative acts necessary for the realization of the Labour Code of the Republic of Uzbekistan
- Decree of the Cabinet of the Ministers No. 1011 of 22 December 2017 "On Perfection of the Methodology of Definition of Number of People in Need of Job Placement, including the Methodology for Observing Households with Regard to Employment Issues, also for the Development of Balance of Labour Resources, Employment and Job Placement of Population".
- Decree of the Cabinet of the Ministers No. 965 of 5 December 2017 "On the Measures of Further Perfection of the Procedure of Establishment and Reservation of Minimum Number of Job Places for the Job Placement of Persons who are in need of Social Protection and Face Difficulties in Searching Employment and Incapable of Competing in Labour Market with Equal Conditions".
- Decree No. 964 of 5 December 2017 "On the Measures for Perfection of the Activity of Self-Government Bodies Aimed at Ensuring Employment, Firstly for the Youth and Women".

#### **NATIONAL / LOCAL REQUIREMENTS OF EIA/ESIA;**

The national Environmental Impact Assessment (EIA) procedure is principally required and regulated by the:

- Law "On Ecological Expertise" No.73-II of 25.05.2000 (as amended on 29.04.2011)
- Resolution of Cabinet of Ministers of Republic of Uzbekistan No.541 "On further improvement of the environmental impact assessment mechanism, 2020".

## OVERHEAD TRANSMISSION LINES & SUBSTATION

- Resolution of Cabinet of Ministers of Republic of Uzbekistan No.95 "On approval of general technical regulations of environmental safety" (2020).
- Decree of the Cabinet of Ministers of the Republic of Uzbekistan No.1050 "On approval of Rules for Protection of Power Grid Facilities, 2018".
- San Rules & Norms No. 0236-07 "Sanitary norms and rules to ensure safety for people living near high voltage power transmission lines, 2007".
- San Rules & Norms No. 0350-17 "Sanitary norms and rules for the protection of atmospheric air in populated areas of the Republic of. Uzbekistan, 2017".

## LAND RIGHTS, ACQUISITION AND RESETTLEMENT

- Civil Code of the Republic of Uzbekistan "Civil code" (№ 163- I, 21.12.1995, as amended on 22.01.2020);
- Land Code (1998 as amended 2010) (№ 598-I, 30.04.1998, as amended on 28.08.2019);
- Law of the Republic of Uzbekistan on State Land Cadastre No.666-I of 28.08.1998.

### 3.1.9 Environmental Regulator

The main regulatory body for national EIA in Uzbekistan is the State Committee of the Republic of Uzbekistan for Ecology and Environmental Protection of the Republic of Uzbekistan. The committee performs its activities on the basis of the following legal acts:

- Presidential Decree of April 21, 2017 No. UP-5024 "On improving the system of public administration in the field of ecology and environmental protection."
- Resolution of the President of the Republic of Uzbekistan of April 21, 2017 No. PP-2915 "On measures to ensure the organization of the activities of the State Committee of the Republic of Uzbekistan on Ecology and Environmental Protection".
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated January 15, 2019 No. 29 "On Approving the Provision on the State Committee of the Republic of Uzbekistan on Ecology and Environmental Protection".
- Resolution of the President of the Republic of Uzbekistan dated October 3, 2018 No. PP-3956 "On measures to ensure the organization of the activities of the State Committee of the Republic of Uzbekistan on Ecology and Environmental Protection".

### 3.1.10 Presidential Decree No. 169 of 2022 – For the Implementation of a 100 MW Wind Farm in the Karauzak District

A Presidential Decree for the Project has been published. The Decree states key project information such as finance details, Project company, and details of related to the off-taker.

## 3.2 International Conventions/Protocol

The proposed Project must comply with the environmental requirements of the following protocols and conventions listed in the Table below of which the Uzbekistan is a signatory:

**Table 3-1 International Protocols and Conventions**

NAME OF INTERNATIONAL PROTOCOL/CONVENTION	SIGNED/ RATIFIED	RELEVANCE TO THE PROJECT
UN Framework Convention on Climate Change	Accession: 20 June 1993	The Project will comply with all national standards for GHG emissions in order to contribute to Uzbekistan's targets.
Kyoto Protocol to UNFCCC	Ratified: 12 <sup>th</sup> October 1999	
Paris Agreement to UNFCCC	Signed: 19 <sup>th</sup> April 2017	
Montreal Protocol on Substances that Deplete the Ozone Layer (with London, Copenhagen, Montreal amendments)	Accession: 10 <sup>th</sup> June 1998	The Project will support Uzbekistan's contribution towards the protection of the ozone layer by refraining from use of ozone depleting substances.
Vienna Convention on the Protection of Ozone Layer	Accession: 18 May 1993	
UN (Rio) Convention on Biological Diversity	Accession: 19 <sup>th</sup> July 1995	The Project will implement mitigation and management measures to ensure the conservation and protection of terrestrial and canal ecology during the Project lifecycle.
Convention for the Safeguarding of the Intangible Cultural Heritage	Ratified: 29 <sup>th</sup> January 2008	The Project will need to ensure that intangible cultural heritage is not negatively impacted.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	Accession: 10 <sup>th</sup> July 1997	The Project staff and workers will be strictly forbidden from trading in any wild flora and fauna found in the Project site or outside the Project boundaries.
Convention on Migratory Species of Wild Animals	1 May 1998	The project will implement mitigation and management measures to ensure conservation of terrestrial and avian migratory species where identified.
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	Accession: 7 <sup>th</sup> February 1996	The Project will be required to adhere to all national and international standards for hazardous waste generation and management.
United Nations Convention to Combat Desertification	Ratified: 31 August 1995	The Project will not result in accelerated desertification through sourcing of its materials and will contribute to sustainable development.
Paris Convention on Protection of the World Cultural and Natural Heritage	Succession: 13 <sup>th</sup> January 1993	The Project will implement mitigation and management measures where items/sites/monuments of cultural or natural heritage are identified within or near the Project boundaries and notify the relevant authorities immediately.
Stockholm Convention on Persistent Organic Pollutants	Accession: 28 <sup>th</sup> June 2019	The Project will implement control measures to eliminate any use of chemicals under Annex A and B and reduce the

NAME OF INTERNATIONAL PROTOCOL/CONVENTION	SIGNED/ RATIFIED	RELEVANCE TO THE PROJECT
		unintentional release of those under Annex C.
Convention on the Elimination of All Forms of Discrimination against Women	Ratified: 19 Jul 1995	The Project construction and operation will be required to implement appropriate mitigation measures and management plans to ensure that discrimination does not occur.
International Convention on the Elimination of All Forms of Racial Discrimination	Ratified: 28 Sep 1995	
International Covenant on Economic, Social and Cultural Rights	Ratified: 28 Sep 1995	The Project construction and operation will be required to implement appropriate mitigation measures and management plans to ensure that human right violations/abuses do not occur.
Convention on the Rights of the Child	Ratified: 29 Jun 1994	

In addition to the national labour requirements, the Republic of Uzbekistan has also ratified the following ILO conventions.

**Table 3-2 ILO Conventions Ratified by Uzbekistan**

ILO CONVENTIONS	RATIFIED
Convention No 29 on Forced Labour adopted in 1930	13 <sup>th</sup> July 1992
Convention No 87 on Freedom of Association and Protection of the Right to Organise, adopted on 17th of June 1948	12 <sup>th</sup> December 2016
Convention No 98 on the Right to Organise and Collective Bargaining adopted on 8th of June 1949	13 <sup>th</sup> July 1992
Convention No 100 on Equal Remuneration adopted 6th of June 1951	13 <sup>th</sup> July 1992
Convention 111 on Discrimination (Employment and Occupation) adopted 4th of June 1958	13 <sup>th</sup> July 1992
Convention 138 on Minimum Age adopted 6th of June 1973	6 <sup>th</sup> March 2009
Convention 182 on the Worst Forms of Child Labour adopted 17th June 1999	24 <sup>th</sup> June 2008
Convention C105 on the Abolition of Forced Labour Convention, 1957	15 <sup>th</sup> Dec 1997
C187 Promotional Framework for Occupational Safety & Health Convention, 2006	14 <sup>th</sup> September 2021
C081 Labour Inspection Convention 1947	19 <sup>th</sup> Nov 2019
Protocol 29 – to the Forced Labour Convention	16 <sup>th</sup> September 2019

### 3.3 Project Requirements

ACWA Power will pursue an amount of Project Finance from financial institutions who either:

- Have their own internal E&S investment policies/guidelines;
- Are members of the collective environmental and social agreements such as the Equator Principles; or
- Align their E&S policies and guidelines with other established guidelines (such as the IFC Performance Standards).

In addition to the Project requiring alignment with the E&S policies and guidelines of those who are providing financing, the Project is required to be delivered in accordance with the European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy (ESP) 2019 and supporting performance requirements, the Equator Principles IV 2020 and the technical performance criteria set out in certain World Bank Group Environmental, Health and Safety (EHS) Guidelines. The key E&S requirements are therefore summarised below.

### 3.3.1 EBRD

#### **POLICY AND PERFORMANCE REQUIREMENTS**

EBRD has an internal ESP (2019) and a set of specific Performance Requirement (PRs) covering key environmental and social components for consideration, assessment and management in their investments. These reflect EBRD's commitments to promote EU environmental standards as well as the European Principles for the Environment in their investments. The PRs are outlined below:

- PR1: Assessment and Management of Environmental and Social Risks and Impacts;
- PR2: Labour and Working Conditions;
- PR3: Resource Efficiency and Pollution Prevention and Control;
- PR4: Health, Safety and Security;
- PR5: Land Acquisition, Restriction on Land Use and Involuntary Resettlement;
- PR6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- PR7: Indigenous People;
- PR8: Cultural Heritage;
- PR9: Financial Intermediaries, and
- PR10: Information Disclosure and Stakeholder Engagement

### 3.3.2 Equator Principles

The Equator Principles (EP) is a risk assessment framework used by financial institutions to determine, assess and manage the environmental and social risk in Project's financing.

Currently, over seventy-five major financial institutions from around the world have adopted the EPs. These financial institutions operate in more than 100 countries worldwide.

The Equator Principles were updated in 2006 (EPII), 2013 (EPIII) and a further update EPIV came into effect in October 2020. The EPs currently include provisions for the following:

- Principle 1: Review and Categorisation;
- Principle 2: Environmental and Social Assessment;
- Principle 3: Applicable Environmental and Social Standards;
- Principle 4: Environmental and Social Management System and Equator Principles Action Plan;
- Principle 5: Stakeholder Engagement;
- Principle 6: Grievance Mechanism;
- Principle 7: Independent Review;
- Principle 8: Covenants;
- Principle 9: Independent Monitoring and Reporting; and
- Principle 10: Reporting and Transparency.

#### **APPLICABLE STANDARDS**

EP IV establishes the minimum E&S standards to be adopted by EP Financial Institution (EPFIs) as those from IFC Performance Standards on Environmental and Social Sustainability (Performance Standards), the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines) and/or the relevant host country laws, regulations and permits that pertain to environmental and social issues.

#### IFC Performance Standards

The IFC Performance Standards are a key component of the IFC's Sustainability Framework and directed towards clients (i.e. party responsible for implementing and operating the project that is being financed), providing guidance on how to identify risks and impacts. The IFC Performance Standards are designed to help avoid, mitigate, and manage risks and impacts throughout the life of a project as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities.

The IFC Performance Standards (2012) are listed below:

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
- Performance Standard 2: Labour and Working Conditions
- Performance Standard 3: Resource Efficiency and Pollution Prevention
- Performance Standard 4: Community Health, Safety, and Security
- Performance Standard 5: Land Acquisition and Involuntary Resettlement
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- Performance Standard 7: Indigenous Peoples
- Performance Standard 8: Cultural Heritage

#### WBG EHS Guidelines (2007)

The World Bank Group International Finance Corporation (IFC), Environmental, Health and Safety (EHS) General Guidelines of April 2007 superseded the World Bank Handbook issue of 1998.

In terms of specific guidelines to control environmental externalities (e.g. wastewater quality etc.), EHS guidelines have been set out by IFC and the World Bank Group to provide general guidelines for its members when involved in a project or when providing financial support to a project. These guidelines contain general and industry-specific examples of Good International Industry Practice (GIIP). In summary, it should be noted that the following IFC EHS Guidelines are relevant to this project:

- General EHS Guidelines, Environmental:
  - Air Emissions and Ambient Air Quality;
  - Energy Conservation;
  - Wastewater and Ambient Water Quality;
  - Water Conservation;
  - Hazardous Materials Management;
  - Waste Management;
  - Noise; and,
  - Contaminated Land.
- General EHS Guidelines, Occupational Health & Safety:
  - General Facility Design and Operation;
  - Communication and Training;
  - Physical Hazards;
  - Chemical Hazards;



- Radiological Hazards;
- Personal Protective Equipment (PPE);
- Special Hazard Environment; and,
- Monitoring.
- Community Health & Safety:
  - Water Quality and Availability;
  - Structural Safety of Project Infrastructure;
  - Life and Fire Safety (L&FS);
  - Traffic Safety;
  - Transport of Hazardous Materials;
  - Disease prevention; and,
  - Emergency Preparedness and Response
- Industry Sector Guidelines, Power:
  - Electric Power Transmission and Distribution (2007); and
  - Wind Energy (2015).

### 3.4 Applicable Environmental Standards

Applicable standards required for Project compliance are included to the respective environmental parameter sections of this report. This includes national standards and those expected for the lenders.

#### 3.4.1 Lenders Standards

An overview of the lender standards is presented below, whilst the applicable standards are presented in the respective environmental parameter sections of this report.

##### **EBRD**

In accordance with the EBRD ESP 2019, *'The EBRD, as a signatory to the European Principles for the Environment, is committed to promoting the adoption of EU environmental principles, practices and substantive standards by EBRD-financed projects, where these can be applied at the project level, regardless of their geographical location. When host country regulations differ from EU substantive environmental standards, projects will be expected to meet whichever is more stringent.'*

##### **EPFIs**

In accordance with EPIV, EPFI's require compliance with both national regulations/standards and the applicable World Bank Group EHS Guidelines relevant to the Project as stated previously.



## 3.5 EIA/ESIA Requirements

### 3.5.1 National Requirements

#### PROJECT CATEGORISATION

As per the Resolution of the Cabinet of Ministries of the Republic of Uzbekistan No. 541 'On measures for the further improvement of environmental impact assessment' dated 7.10.2020, Projects with a total capacity of 100 MW and more are categorised as Category II.

#### EIA PROCESS

In accordance with the resolution of the Cabinet of Ministries of the Republic of Uzbekistan No. 541 the national EIA process consists of three stages:

- Stage I: "A Preliminary Statement of the Environmental Impact ("PSEI") - this is performed at the planning stage of the proposed Project prior to the allocation of funds for development.
- Stage II: The "Statement of the Environmental Impact" ("SEI") - this is prepared following Stage 1 and where the outcome of Stage 1 identified the need for additional studies or analyses. The SEI shall be submitted to State committee on ecology and environmental protection prior to the Feasibility Study or financing of the Project and, therefore, prior to the beginning of construction.
- Stage III: The "Statement on Environmental Consequences" ("SEC") is the final stage of the SEE process and is performed prior to approval of the Project. The report describes in detail the changes in the project made as a result of the outcomes of Stage 1 and Stage 2, the comments received during public consultations, the environmental standards applicable to the project (as defined by the modelling and assessment process), the environmental monitoring requirements and the main conclusions.

State Ecological Expertise approval: The State Committee on Ecology and Environmental Protection provides their opinion at Stage I and II is a typically a mandatory document for project financing by Uzbek banks, other Lenders and for Project commissioning at Stage III. However, it is possible to obtain approval after Stage I should the submitted EIA be sufficiently detailed and comprehensive with respect to project information and baseline conditions. The conclusion of the State Committee is typically valid for three years from the date of its issuance. If the project is not implemented within three years from the date of issue of the conclusion, the EIA report needs to be revised and re-submitted for approval.

#### EBRD

In accordance with PR 1, there is a requirement for EBRD financed projects to undertake an appropriate Environmental and Social Assessment in order to:

- Identify and evaluate environmental and social impacts and issues of the Project.
- Adopt a mitigation hierarchy approach to address adverse environmental or social impacts and issues to workers, affected communities, and the environment from Project activities.
- Promote improved environmental and social performance of clients through the effective use of management systems.
- Develop an ESMS tailored to the nature of the Project, for assessing and managing environmental and social issues and impacts in a manner consistent with the relevant PRs.

According to PR 1 *"The ESIA will include an examination of technically and financially feasible alternatives to the sources of such impacts, including the non-project alternative, and document the rationale in selecting the particular course of action proposed. It will also identify potential improvement opportunities and recommend measures needed to avoid, or where avoidance is not possible, minimise and mitigate adverse impacts."*

#### EU EIA Legislation

EBRD is committed towards the promotion of the European Union's (EU) environmental requirements and is a signatory of the European Principles for the Environment. The Principles endorse and reinforce the European consensus on the values attached to the fundamental right for both present and future generations throughout the world to live in a healthy environment.

EIA Directive 85/337/EEC was introduced in 1985 and applied to a wide range of defined public and private projects. Since then, the initial Directive of 1985 and its three amendments have been codified by Directive 2011/92/EU of 13 December 2011. Directive 2011/92/EU was amended in 2014 by Directive 2014/52/EU.

Article 3 of the Directive states:

*The environmental impact assessment shall identify, describe and assess in appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:*

- a) Population and human health;*
- b) Biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;*
- c) Land, soil, water, air and climate;*
- d) Material assets, cultural heritage and the landscape; and*

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e) *The interaction between the factors referred to in points (a) to (d).*

The Project falls under Annex II of the EIA Directive as 'Installation for the harnessing of wind power for energy production (wind farms)' while the OHTL is under Annex I 'Construction of overhead electrical power lines with a voltage of 220kV or more and a length of more than 15km'. The Project will therefore undergo through a full EIA assessment.

#### **EPFIs**

According to EP2, 'The EPFI will require the client to conduct an appropriate Assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and scale of impacts of the proposed Project'.

## 4 APPROACH TO ESIA

### 4.1 ESIA Team

ACWA Power has engaged 5 Capitals to lead the environmental and social process with regard to the Project. This includes supporting the Project consortium up to financial close with their prospective lenders.

In order to ensure that the Project meets the requirements of the SCEEP, 5 Capitals sub-contracted Juru Energy, who were responsible for the national EIA for submission to SCEEP and certain elements of the ESIA process, including baseline studies, stakeholder identification and engagement/consultation and liaison with relevant government authorities in Uzbekistan.

**Table 4-1 5 Capitals' Project Team**

NAME	ROLE
Ken Wade	Project Director
Barney Chesher	Project Manager and ESIA Specialist
Max Burrow	ESIA Specialist
Sonya Benjamin	Biodiversity Specialist
Sheril Thomas	Biodiversity Specialist
Dr. Sunil Patel	Noise and Shadow Flicker Specialist

**Table 4-2 Juru Energy Project Team**


NAME	ROLE
Viktoriya Filatova	Project Manager
Eleonora Ishmuhamedova	Environmental Expert
Lyudmila Slobodkina	Baseline Surveyor
Askar Makhmudov	Social Specialist
Mariya Gritzina	Biodiversity Expert (mammals, bat roost search)
Natalia Sidorchuk	Bat Expert
Anna Ten	National Ornithologist
Natalya Beshko	Botanist
Timur Abduraupov	Herpetology Expert

## 4.2 Impact Assessment Methodology

### 4.2.1 Process

The ESIA process is a systematic tool for examining and assessing the potential beneficial and adverse environmental and social impacts of a proposed development. In addition to identifying impacts of the Project, the ESIA has also identified key environmental and social mitigation measures and guidance to avoid, minimise and compensate for any adverse environmental and social impacts associated with the construction and operation of the Project. The ESIA process is summarised in the table below and in the following sections.

**Table 4-3 Overview of the ESIA process**

STAGE	TASK	OBJECTIVE
<b>Scoping</b>	Gap Analysis	Identify the approach, methodology and data requirements of the ESIA
<b>ESIA</b> 	Consultation	Consult with statutory and non-statutory organisations and individuals with an interest in the development
	Desk Based Literature Review	Use existing secondary information and data sources to obtain information on the environmental and social conditions of the development site and immediate surroundings.
	Primary Data Collection	Characterise the existing physical, ecological and social conditions of the development site and immediate surroundings.
	Specialist Studies	Further investigate those environmental parameters which may be subject to potentially significant impacts.
	Impact Assessment	Evaluate the existing environment and social conditions in terms of sensitivity to predict the magnitude and associated significance of the potential impacts.
	Mitigation Measures	Identify appropriate and practicable mitigation and enhancement measures to avoid, minimise and/or offset any adverse impacts. Monitoring plans are proposed to monitor residual impacts.

To obtain a credible assessment of environmental and social impacts, the assignment of 'significance' to each identified impact needs to be a robust, consistent and transparent process. The methodology to assess 'effect significance' is outlined below and follows a GIIP approach based on the assumption that the significance of an impact on resources or receptors is considered to result from an interaction between two factors:

- The nature and magnitude of the impact (i.e., a change in the environment, social and/or health baseline conditions); and
- The environmental value or sensitivity of those resources or receptors to the change.

A three-step approach has been used to determine the significance of environmental and social impacts, as follows:

- **Step 1** – Evaluation of value/sensitivity/vulnerability of resource or receptor;
- **Step 2** – Assessing the magnitude of the impact on the resource or receptor; a
- **Step 3** – Determining the significance of impacts

## 4.2.2 Impact Assessment Significance Criteria

### 4.2.2.1 Determining Receptor Sensitivity

The sensitivity of a receptor is understood as the sensitivity of the environmental or social receptor to change, including its capacity to accommodate changes that the Project may bring about. The sensitivity is assigned at the receptor level and as such details regarding sensitivity are provided within the topic specific chapters of this Report. The table below outlines the definition criteria upon which the receptor sensitivities of this ESIA are based.

Sensitive receptors are defined as:

- Elements of the environment that are of value to the functioning of natural systems (i.e., areas or elements of ecological, landscape or heritage value, species, habitats and ecosystems, soil, air and water bodies or land-use patterns); and
- **Human** receptors, such as stakeholders (i.e., users of dwellings, places of recreation, places of employment, community facilities or household relocation, cultural heritage – tangible & intangible-, community health, livelihoods & economic activities, gender relationships) and human systems (e.g. employment market, population disease susceptibility and disease communicability, public infrastructure and services, exposure to toxicity of chemicals).

**Table 4-4 Receptor Sensitivity Criteria**

SENSITIVITY	DESCRIPTION OF VALUE
<b>Very High</b>	<ul style="list-style-type: none"> <li>• High importance and rarity on an international scale and limited or no potential for substitution.</li> <li>• The receptor has already reached its carrying capacity, so any further impact is likely to lead to an excessive damage to the system that it supports (e.g., very limited or non-existent infrastructure and services such as hospitals and schools, available natural, economic or local resources are not sufficient to provide means of livelihoods for all local populations).</li> <li>• Locations or communities that are highly vulnerable to the environmental and social impact under consideration or critical for society (e.g., indigenous peoples, hospitals, schools).</li> <li>• Other examples are very high proportion of vulnerable groups (women, elderly, disabled, etc.) in the Project area, very frequent occurrences of gender based violence, very low probability of female participation in decision making and in the labour market, archaeological items of international importance or designated UNESCO world heritage sites, tangible or intangible cultural assets that contribute to international research objectives, etc.</li> </ul>

SENSITIVITY	DESCRIPTION OF VALUE
<b>High</b>	<ul style="list-style-type: none"> <li>• High importance and rarity on a national scale, and limited potential for substitution.</li> <li>• The receptor is close to reaching its carrying capacity, so a further impact may lead to a significant damage to the system that it supports (e.g., poor or limited public infrastructure and services, with limited access and high pressure on existing natural or economic resources available).</li> <li>• Locations or communities that are particularly vulnerable to the environmental impact under consideration (e.g., residential areas, vulnerable/marginalized groups).</li> <li>• Other examples are high proportion of vulnerable/marginalised groups (women, elderly, disabled, etc.), locations with poor health practices, poor education level, high crime rate, frequent occurrences of gender-based violence, tangible or intangible cultural assets that contribute to national research objectives, etc ).</li> </ul>
<b>Medium</b>	<ul style="list-style-type: none"> <li>• High or medium importance and rarity on a regional scale, limited potential for substitution.</li> <li>• The receptor is already significantly impacted, but it is not close to reaching its carrying capacity. Further impacts will get increase the stress of the underlying system, but evidence does not suggest that it is about to reach a critical point (e.g., public infrastructure and services with some capacity, alternative natural or economic resources are available but not sufficient or easily accessible).</li> <li>• Locations or groups that are relatively vulnerable to the environmental impact under consideration (e.g., commercial areas).</li> <li>• Other examples area: average proportion of vulnerable/marginalised groups, occasional occurrences of gender-based violence, tangible or intangible cultural assets that contribute to regional research objectives, etc).</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>• Low or medium importance and rarity on a local scale.</li> <li>• The receptor is not significantly impacted and shows a large spare carrying capacity. Impacts are not likely to generate any noticeable stress in the underlying system (e.g., reasonable public infrastructures and services, sufficient natural, economic or local resources available but not easily accessible).</li> <li>• Locations or groups that show a low vulnerability to the environmental impact under consideration (e.g., industrial areas).</li> <li>• Other examples are low proportion of vulnerable/marginalised groups, rare occurrences of gender based violence, tangible or intangible cultural assets that contribute to local research objectives, etc).</li> </ul>
<b>Very Low</b>	<ul style="list-style-type: none"> <li>• Very low importance and rarity on a local scale.</li> <li>• The receptor is not impacted and shows a very large spare carrying capacity. Impacts are very unlikely to generate any noticeable stress in the underlying system (e.g., very good public infrastructures and services with some capacity, equivalent natural, economic or local resources available and easily accessibly).</li> <li>• Locations or groups that show a very low vulnerability to the environmental impact under consideration (e.g., industrial areas).</li> <li>• Other examples are very low proportion of vulnerable/marginalised groups, no occurrence of gender based violence, tangible or intangible cultural assets that are not legally protected and have no significance to local people (i.e. local people no longer use the cultural asset, etc).</li> </ul>



#### 4.2.2.2 Identifying Potential Impacts

The following types of impacts have been considered:

- Direct Impacts - Potential impacts that may result from the construction, commissioning, and operations of the Project acting directly on an environmental or social receptor;
- Indirect Impacts – Potential impacts which are not a direct result of a Project activity, that may be realised later in time or at distances further removed from the project footprint, but are normally a result of a complex pathway;
- Cumulative Impacts – Changes to the environment that are caused by an action in combination with other past present and future actions;
- Beneficial Impacts – Those impacts that have a positive, desirable or favourable effect on the sensitive resources or receptors (e.g. landscape providing artificial habitat for a variety of species, jobs opportunities during the construction and/or occupation phases of a project);
- Adverse Impacts – Those impacts that are detrimental and have a negative influence on the environment, social structures, resources or other receptors;
- Secondary Impacts - Potential impacts that may result from the implementation of protection measures applied to mitigate potential direct impacts; and
- Event Related Impacts - Potential unplanned or accidental impacts stemming from an unintentional event such as fire, explosion, oil spill, etc.

#### 4.2.2.3 Determining Impact Magnitude

The magnitude of an impact has numerous components, for example:

- The extent of physical change;
- The level of change in an environmental condition;
- The permanence of impact and the reversibility of the impacted condition;
- Its spatial footprint;
- Its duration and frequency; and
- Its likelihood of occurrence where the impact is not certain to occur.

The magnitude of the impact will be defined wherever possible in quantitative terms and where necessary, the determination of impact magnitude will be assisted through the use of modelling. The general criteria used for identifying the magnitude of impacts is provided within the table below.

**Table 4-5 Impact Magnitude Criteria**

MAGNITUDE	DESCRIPTION OF MAGNITUDE
<b>Major</b>	<p><b>Adverse:</b> Loss of resource and/or quality and integrity; severe damage to key characteristics, features or elements. A major impact is usually large in extent, permanent and irreversible.</p> <p><b>Beneficial:</b> Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality.</p>
<b>Moderate</b>	<p><b>Adverse:</b> Significant impact on the resource, but not adversely affecting the integrity; Partial loss of/damage to key characteristics, features or elements. Moderate impacts usually extend outside the site boundary, and are usually permanent, irreversible or cumulative.</p> <p><b>Beneficial:</b> Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.</p>
<b>Minor</b>	<p><b>Adverse:</b> Some measurable change in attributes quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements. Minor impacts usually are only noticeable within the site and are temporary and reversible.</p> <p><b>Beneficial:</b> Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.</p>
<b>Negligible</b>	<p><b>Adverse:</b> Very minor loss or detrimental alteration to one or more characteristics, features or elements.</p> <p><b>Beneficial:</b> Very minor benefit to or positive addition of one or more characteristics, features or elements.</p>
<b>No change</b>	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

#### 4.2.2.4 Determining Significance

The significance of effects is a combination of the sensitivity of a receptor or resource and the magnitude of the project impact.

The following matrix provides criterion used for determining the significance of environmental effects through consideration of the potential magnitude of impact and sensitivity of the associated receptor.

As is evident from the matrix, in some cases the significance product is a range (i.e., a 'Minor' Magnitude and a 'Very High' Sensitivity results in a 'Moderate to Major' Significance). In these cases, professional judgement will be used to determine which significance the impact best represents.

**Table 4-6 Criteria for Determining Significance of Effects**

		MAGNITUDE OF IMPACT (DEGREE OF CHANGE)				
		No change	Negligible	Minor	Moderate	Major
SENSITIVITY OF RECEPTOR	Very High	Neutral	Minor	Moderate to Major	Major	Major
	High	Neutral	Minor	Minor to moderate	Moderate to Major	Major
	Medium	Neutral	Negligible to minor	Minor	Moderate	Moderate to Major
	Low	Neutral	Negligible to minor	Negligible to minor	Minor	Minor to moderate
	Very Low	Neutral	Negligible	Negligible to minor	Minor	Minor

The following table outlines general definitions of significance.

**Table 4-7 Definition of Significance**

SIGNIFICANCE CATEGORY	CRITERIA
<b>Major</b>	<ul style="list-style-type: none"> <li>The impact is large scale and would cause a large improvement or deterioration in the environment,</li> <li>Adverse impacts may be considered unacceptable due to exceeded of statutory limits and may require additional studies to ascertain if alternatives (in terms design and location) with the potential for lower impacts should be considered. These impacts represent key factors in the decision-making process.</li> <li>These impacts are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.</li> </ul>
<b>Moderate</b>	<ul style="list-style-type: none"> <li>The impact gives rise to noticeable improvement or deterioration to the existing environment at a regional or local scale.</li> <li>If adverse, impacts are potential concerns to the project and may become key factors in the decision-making process.</li> <li>Whilst the impacts will be experienced, mitigation measures and detailed design work may reduce (or enhance) the effect. Some residual effects will still arise.</li> </ul>
<b>Minor</b>	<ul style="list-style-type: none"> <li>The impact is small scale and would cause a small improvement or deterioration to the existing environment.</li> <li>Adverse effects are undesirable but acceptable and within statutory limits and not likely to be key decision-making issues.</li> <li>Mitigation measures are typically not required to mitigate such effects.</li> <li>The cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource.</li> </ul>

SIGNIFICANCE CATEGORY	CRITERIA
<b>Negligible</b>	<ul style="list-style-type: none"> <li>No discernible improvement or deterioration to the existing environment as a result of the Project will occur.</li> <li>Local issue unlikely to be of importance in the decision-making process.</li> <li>Effects do not exceed statutory limits.</li> <li>They are of relevance in enhancing the subsequent design of the project and consideration of mitigation or compensation measures.</li> </ul>
<b>Neutral</b>	<ul style="list-style-type: none"> <li>No effect or effect that is beneath the level of perception, within normal bounds of variation or within the margin of forecasting error.</li> <li>No mitigation is required.</li> </ul>

The approach to assigning significance relies on reasoned argument, professional judgement and cognisance to the advice and views of the appropriate regulators and organisation. For some disciplines, it is determined by comparison, wherever possible with locally, nationally or internationally accepted standards.

#### 4.2.3 Mitigation and Management Measures

A key component of the ESIA process is to explore practical ways of avoiding or reducing potentially significant impacts caused by development of the Project. These are commonly referred to as mitigation measures and will be incorporated into this Report and the future CESMP and Operational ESMP (OESMP). Mitigation will be aimed at preventing, minimising or managing significant adverse impacts to as low as reasonably practicable (ALARP) and enhancing and maximising any potential beneficial impacts of the Project.

The approach taken to identifying and incorporating mitigation measures into the Project is based on a typical hierarchy of decisions and measures. This is aimed at ensuring that, wherever possible, potential impacts are mitigated at source rather than mitigated through restoration after the impact has occurred. In ensuring the Project achieves the applicable environmental standards and guidelines, mitigation measures have been adopted within the Project's design. In addition to specific measures included within the design of the Project, the ESIA will outline further mitigation and/or management measures for the construction and the operational phases, upon which the Project can further minimise or avoid negative impacts and enhance positive impacts.

Upon approval of the Project, the stated mitigation and management measures in the approved ESIA will be required for implementation as a condition of the Environmental Permit or as part of the lenders loan agreement.

#### 4.2.4 Residual Impacts

The residual impacts section considers the overall significance of impacts following the implementation of the additional mitigation and management measures not included by

design. The significance of such impacts is based upon the same criteria used to determine the impact significance stated above.

#### 4.2.5 Cumulative Impacts

Cumulative impacts are those impacts that result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones.

In practice, the assessment of cumulative effects requires consideration of some concepts:

- Assessment of effects over a larger (i.e., "regional") area that may be transboundary/cross-jurisdictional; (including effects due to natural perturbations affecting environmental components and human actions).
- Assessment of effects during a longer period of time into the past and future;
- Assessment of effects on Valued Environmental Components due to interactions with other actions, and not just the effects of the single action under review; and
- Evaluation of significance in consideration of other than just local, direct effects.

## 5 STAKEHOLDER ENGAGEMENT

The following is a summary of the Project's Stakeholder Engagement conducted to date, refer to the Stakeholder Engagement Plan for further details of stakeholder engagement conducted to date and the plan for upcoming engagement.

### 5.1 National Requirements

Since December 1, 2020, in accordance with Annex 3 to the Decree 541, the planned activities of I and II categories of environmental impact are subject to public hearings. The state environmental expertise of the national EIA reports is carried out in case of approval by the local community as a result of public hearings. Public hearings must be conducted according to the procedure indicated in the law, representing all environmental impact assessments (to be justified by calculations) for construction and operation phases (if applicable).

### 5.2 Lender Requirements

Engagement with stakeholders is an essential part of the environmental and social assessment process. The main objective is to establish meaningful dialogue with those parties who may be involved in aspects of the Project or may have an interest in the outcome of the ESIA process.

Further details with regards to Lender Requirements for engagement with stakeholders are provided in the SEP.

### 5.3 Stakeholder Mapping and Engagement Planning

The aim of the stakeholder mapping is to identify relevant stakeholders and to assess each stakeholder to understand their relevance so that consultation can be targeted and prioritised.

In light of the on-going COVID-19 pandemic and possible movement restrictions in Uzbekistan, the typical face-to-face process for stakeholder engagement may be varied to contact stakeholders by video/phone calls as well as sending/receiving official letters. Where possible the typical face-to-face process for engagement has been preferred throughout the ESIA. In case of any future movement or contact restrictions, back-up options for engagement have been considered as outlined in the table below.

It is important to note that at this stage, the situation is dynamic and that both stakeholders and their interests might change over time, in terms of level of relevance to the Project and the need to actively engage at various stages.

**Table 5-1 Stakeholder Mapping and Engagement**

STAKEHOLDER GROUP	STAKEHOLDER BODIES	RELEVANCE TO PROJECT: AFFECTED (A), INTEREST-BASED (I), OR DECISION MAKER (D)
<b>Directly Affected Communities and Land Users</b>	Local communities (includes Abay and Altinsay communities of the Beruniy district). Local communities also include the community sub-groups such as men, women, elderly, youth, vulnerable etc.	A: Potential socioeconomic impacts
	Miners and nearby industrial facilities (Karakalpak Cement LLC, Boston Talk etc.)	A: Impacts from the construction activities of proposed access road and OHTL.
	Herder family using the site	A: Adverse effect from construction activity and land use restriction.
	State Committee on Sericulture and Wool Industry Development (SWID) of the Republic of Karakalpakstan	A: Impacts on land acquisition for Project site and associated facilities
	Municipalities of Karauzak and Beruniy districts	A: Impacts on land acquisition for Project site and associated facilities
<b>Indirectly Affected Land Users</b>	Railway Authority (O'zbekiston Temir Yo'llari JSC)	A: There is a railway line located 9.6 km to the north of the Project site
<b>Local Governmental Authorities</b>	Karauzak district khokimiyat and Beruniy district khokimiyat	D: Statutory Consultees, Project is located within their municipalities
	Council of Ministries of Republic of Karakalpakstan	
	Beruniy and Karauzak district Departments of Ecology and Environmental Protection	
<b>Government Bodies</b>	Uztransgaz JSC	I: Statutory consultees
	"National Power Networks of the Republic of Uzbekistan" JSC	I: Statutory consultees
	Ministry of Energy of the Republic of Uzbekistan	I: Statutory consultees
	Ministry of Transportation	I: Statutory consultees
	Ministry of Employment and Labour Relations of the Republic of Uzbekistan	I: Statutory consultees
	Ministry of Health	I: Statutory consultees Protection of employee and public safety; establishment of the sanitary zone along the OHTL and substation
	Ministry of Emergency Situations of the Republic of Uzbekistan	I: Statutory consultees (Planning preparedness for emergencies)



STAKEHOLDER GROUP	STAKEHOLDER BODIES	RELEVANCE TO PROJECT: AFFECTED (A), INTEREST-BASED (I), OR DECISION MAKER (D)
	Sanitary and Epidemiological Welfare and Public Health Service of The Republic of Uzbekistan	I: Statutory Consultees
	State committee of the Republic of Uzbekistan on Ecology and Environmental protection	D: Statutory consultees. Control with National environmental policy and protection standards. Responsible for approval national EIA.
	Ministry for Information & Communications Technology Development	I: Statutory Consultees
	Ministry of Water Resources of the Republic of Uzbekistan	I: Statutory Consultees
<b>State Companies / Agencies</b>	"State Committee for Land Resources, Surveys, Cartography and the State Cadaster (or Goskomgeodezkadastr)	I: Statutory consultees
	State committee of the Republic of Uzbekistan on Geology and Mineral Resources	D: Provides information on existing mining areas near the Project site and its associated facilities and determines technical conditions for construction works
	Institute of Archaeology	D: Provides information on objects of archaeological heritage and technical conditions applicable for construction works (if there are existing archaeological objects at project site and its associated facilities)
	Cultural Heritage Agency	D: Provides information on objects of cultural heritage and technical conditions applicable for construction works (if there are existing cultural objects at project site and its associated facilities)
<b>Media</b>	Regional and local mass media	I: Will potentially be involved in disseminating information about the Project.
<b>Political parties of environmental focus</b>	Ecological party of Uzbekistan	I: Will be interested in the execution of the Project and its environmental impacts and mitigation measures.
<b>Non-Governmental Organisations (NGOs)</b>	Centre for social and legal support for women and their families "Qalb mehri" NGO	I: Interested in potential environmental and social impacts arising from the Project.
	"Women leaders" NGO	
	"Golden heritage of Aral" NGO	
	Union for Defence of the Aral Sea and Amu Darya NGO	
	Centre for citizen's initiatives support NGO	
	"Business women" NGO	

STAKEHOLDER GROUP	STAKEHOLDER BODIES	RELEVANCE TO PROJECT: AFFECTED (A), INTEREST-BASED (I), OR DECISION MAKER (D)
	Association for Bird Protection (Karakalpakstan branch)	I: Interested in Project potential impacts on birds
<b>Financial institutions</b>	Lenders	D: Providing finance for the Project

## 5.4 Stakeholder Engagement

The following subsections provide a brief summary of key items of stakeholder engagement undertaken for the Project during the Scoping and ESIA phase. For a detailed overview, details of the grievance mechanism and the plan for upcoming stakeholder engagement, refer to the Project specific SEP.

### 5.4.1 Public Hearings

Since December 1, 2020, in accordance with Annex 3 to the Decree 541, the planned activities of I and II categories of environmental impact are subject to public hearings. The state environmental expertise of the national EIA reports is carried out in case of approval by the local community as a result of the public hearings. Public hearings must be conducted according to the procedure indicated in the law, representing all environmental impact assessments (to be justified by calculations) for construction and operation phases (if applicable).

Public hearings were conducted at Karauzak and Beruniy Municipalities on 18<sup>th</sup> April and 19<sup>th</sup> April 2022 respectively.



**Figure 5-1 Public Hearing in Beruniy**

### 5.4.2 Local Communities

Public disclosure/consultations of the Project with local communities was undertaken on the 19<sup>th</sup> and 20<sup>th</sup> April. This entailed presentations, and distribution of a brochure containing:

- Provision of information on project description
  - Location, purpose, nature and scale of project development
  - Project components and facilities
  - Project milestones
- Potential beneficial and adverse environmental and social impacts
- Grievance Redress Mechanism: contact details for sending feedback, suggestions, inquires etc.
- Questions & Answers

This is not a regulatory process, however, it is being undertaken for local populations and stakeholders who may not have access to online resources to review any future disclosed documents.

In addition, focus group discussions were conducted in the villages in close proximity to the Project, Altinsay and Abay, both villages are administratively located in the Beruni district. General socioeconomic conditions of the village and villagers was gathered during discussions with community leaders. Focus group discussions were conducted separately with men and women.



**Figure 5-2 Consultations with Women in Abay Community**

## 6 AIR QUALITY

### 6.1 Applicable Requirements & Standards

#### 6.1.1 National Regulations

##### THE LAW OF THE REPUBLIC OF UZBEKISTAN “ON ATMOSPHERIC AIR PROTECTION” (1996, AMENDED ON 28.09.2020)

This regulation specifies standards, quality and harmful effects norms, requirements on fuels, lubricants, production and operation of vehicles and other transport means and equipment, ozone layer protection requirements, obligations of enterprises, institutions and organisations toward atmospheric protection, and compensations of damages from atmospheric pollutions.

**SANPiN № 0293-11** “Hygienic regulations. List of maximum permissible concentrations (MPC) of contaminants in the atmospheric air of inhabitant areas in the territory of the Republic of Uzbekistan”

**Table 6-1 Ambient Air Quality MPC (mg/m<sup>3</sup>)**

POLLUTANT	(MPC MG/M <sup>3</sup> )			
	ONE-TIME	24-HOUR	MONTHLY	ANNUAL
<b>NO<sub>2</sub></b>	0.085	0.06	0.05	0.04
<b>NO</b>	0.6	0.25	0.12	0.06
<b>CO</b>	5	4	3.5	3
<b>SO<sub>2</sub></b>	0.5	0.2	0.1	0.05
<b>NH<sub>3</sub></b>	0.2	0.12	0.06	0.04

#### Notes

- Maximum one-time concentration - the highest concentration detected at 20 – 30 minute sampling.
  - Average daily concentration is the average of the one-time concentrations detected during the day or obtained with continuous 24-hour sampling.
  - Monthly average concentration is the average of the average daily concentration detected during the month.
  - Average annual concentration - the average of the number of average monthly concentrations

## 6.1.2 Lender Requirements

### EBRD

Directive 2008/50/EC of the European Parliament and of the Council on ambient air quality and cleaner air for Europe limits pollutants to the standards shown in the following table.

**Table 6-2 EC Ambient Air Quality Standards ( $\mu\text{g}/\text{m}^3$  unless stated)**

POLLUTANT	CONCENTRATION	AVERAGING PERIOD	PERMITTED EXCEEDANCES PER YEAR
<b>PM<sub>2.5</sub></b>	25	Annual	n/a
<b>PM<sub>10</sub></b>	50	24-hour	35
	40	Annual	n/a
<b>Sulphur Dioxide</b>	350	1-hour	24
	125	24-hour	3
<b>Nitrogen Dioxide</b>	200	1-hour	18
	40	Annual	n/a
<b>Lead</b>	0.5	Annual	n/a
<b>Carbon Monoxide</b>	10 mg/m <sup>3</sup>	Maximum Daily 8-hour mean	n/a
<b>Benzene</b>	5	Annual	n/a
<b>Ozone</b>	120	Maximum Daily 8-hour mean	25 days averaged over 3 years
<b>Arsenic</b>	6 ng/m <sup>3</sup>	Annual	n/a
<b>Cadmium</b>	5 ng/m <sup>3</sup>	Annual	n/a
<b>Nickel</b>	20 ng/m <sup>3</sup>	Annual	n/a
<b>PAH</b>	1 ng/m <sup>3</sup> (expressed as concentration of Benzo(a)pyrene)	Annual	n/a

**Note:** Not being a member State of the EU, it is noted that the Uzbekistan government does not manage ambient air quality in line with these standards, and as such the applicability of these standards in this ESIA assessment will only be for good practice benchmarking purposes, and not compliance purpose/assessment.

### EPFIs

WHO ambient air quality standards as adopted by the IFC General EHS Guidelines are presented in the following table.



**Table 6-3 WHO Ambient Air Quality Standards ( $\mu\text{g}/\text{m}^3$ )**

PARAMETER	24 HOUR	ANNUAL
<b>PM<sub>10</sub></b>	150 (Interim target 1)	70 (Interim target 1)
	100 (Interim target 2)	50 (Interim target 2)
	75 (Interim target 3)	30 (Interim target 3)
	50 (Interim target 4)	20 (Interim target 4)
	45 (guideline)	15 (guideline)
<b>PM<sub>2.5</sub></b>	75 (Interim target 1)	35 (Interim target 1)
	50 (Interim target 2)	25 (Interim target 2)
	37.5 (Interim target 3)	15 (Interim target 3)
	25 (Interim target 4)	10 (Interim target 4)
	15 (guideline)	5 (guideline)
<b>NO<sub>2</sub></b>	120 (Interim target 1) 50 (Interim target 2) 25 (guideline)	40 (Interim target 1) 30 (Interim target 2) 20 (Interim target 3) 10 (guideline)
<b>SO<sub>2</sub></b>	125 (Interim target 1)	500 (10-minute guideline)
	50 (Interim target 2)	
	40 (guideline)	
<b>O<sub>3</sub></b>	100 (interim target 1) (8-hour daily maximum)	
	70 (interim target 2) (8-hour daily maximum)	
	60 (8-hour daily maximum guideline)	

## 6.2 Baseline Conditions

The proposed Project area is located in a remote region of Uzbekistan away from major population clusters. There are no major anthropogenic sources of air or dust emissions within 8 km of the wind farm site boundary, however, the site is prone to high winds and it is expected that natural ambient dust concentrations can be high due to the sandy soils and limited vegetation.

Within the wider region, there are vermiculite mines and cement factories (both approximately 10 km from the site boundary for the WTG) typically located along the A380. Emissions from the stack of the two cement facilities were clearly visible during the December 2021 site visit, as shown in the following figure.



**Figure 6-1 Stack Emissions from the Cement Plants**

Visual observations by Juru Energy (2021) suggested that the mining operations contribute to elevated levels of dusts and particulates, likely resulting from a lack of dust abatement or control measures. The following image from December 2021 depicts stockpiling of excavated material at one of the vermiculite mining facilities.



**Figure 6-2 Stockpiling at a Vermiculite Mine**

The industrial facilities in the surrounding areas also require the frequent movement of Heavy Goods Vehicles (HGVs) often carrying materials which can be dispersed by wind if not properly covered and secured. Therefore, elevated particulate matter concentrations in the surrounding region are not uncommon.

## 6.3 Area of Influence and Receptors

### 6.3.1 Area of Influence

During construction, pollutants of concern that may impact ambient air quality include Particulate Matter (PM) from site clearance and other typical construction activities, gaseous emissions from vehicles, machinery and equipment, and minor Volatile Organic Compounds (VOCs) and odour emissions.

References for areas of influences for construction dust and gaseous emissions are provided in the following table.

**Table 6-4 Air Quality Area of Influence**

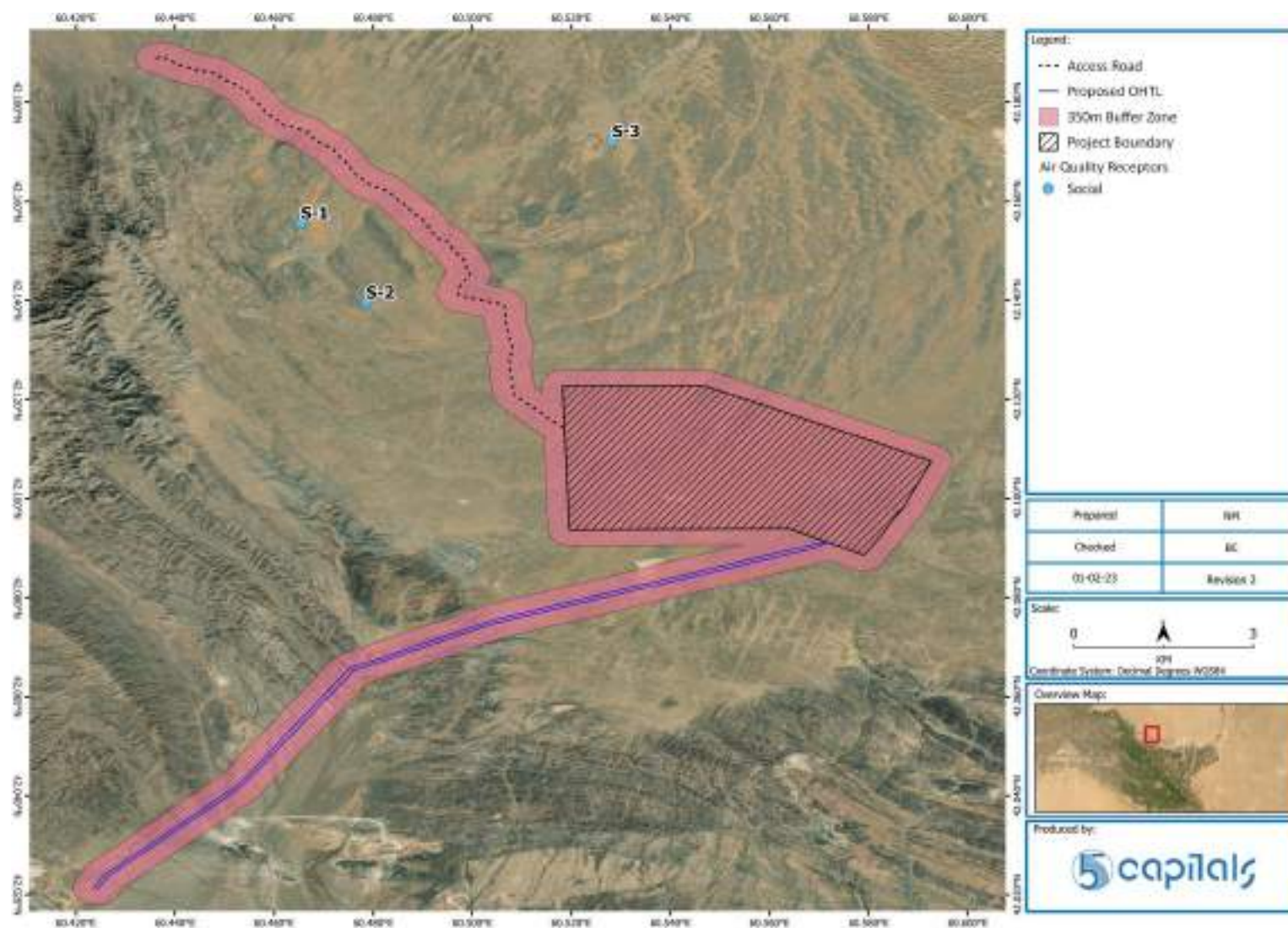
PHASE	POLLUTANT	AREA OF INFLUENCE AND STUDY AREA	REFERENCE
Construction	PM (Dust)	<p>An assessment relating to dust generation is normally required where there is:</p> <ul style="list-style-type: none"> <li>a 'human receptor': <ul style="list-style-type: none"> <li>within 350 m of the boundary of the site.</li> <li>within 50 m of the route used by construction vehicles on public highway, up to 500 m from the project site entrance.</li> </ul> </li> <li>An 'ecological receptor': <ul style="list-style-type: none"> <li>within 50 m of the boundary of the site.</li> <li>within 50 m of the route used by construction vehicles on public highway, up to 500 m from the project site entrance.</li> </ul> </li> </ul>	Institute of Air Quality Management (IAQM) for construction dust, 2014
	Gaseous Pollutants (from vehicular and temporary plant emissions)	Receptors within 200 m of the site or access road to be considered (in regard to vehicular emissions, but considered to be appropriate for construction plant)	The Design Manual for Roads and Bridges, Volume 11, Section 3, Air Quality (HA207/07) 2017
	Odour from sanitary wastewater (only if poorly managed)	Only expected a maximum of 100 m from source for distributed and various temporary toilets/septic tanks.	5 Capitals' project experience
	VOC emissions and odour (only if poorly managed)	Only expected a maximum of 100 m from source for small quantity and distributed storage during construction.	5 Capitals' project experience

### 6.3.2 Receptors

The following figure depicts a 350 m buffer around the access road, OHTL and land allocated for the WTG site boundary. As is evident from the figure, no receptors are within the buffer zone.

Construction workers have been considered as a receptor to air quality impacts, however, it is recognised that the workers will be provided with personal protective equipment (PPE) during onboarding process and/or site induction.

Project construction will impact upon the local airshed, and although this may result in exceedances of national and international limits, the local airshed is not considered an end receptor to air quality impacts. Those who utilise the local airshed are considered receptors to air quality impacts.



**Figure 6-3 Air Quality Sensitive Receptors**



**Table 6-5 Receptor Sensitivity to Air Impacts**

RECEPTOR	SENSITIVITY	JUSTIFICATION
Construction workforce	Low	The construction workforce will be supplied for PPE to manage potential air impacts arising from the Project.

## 6.4 Potential Impacts, Mitigation, Management & Residual Impacts

### 6.4.1 Construction Phase

#### 6.4.1.1 Dust Generation

Dust / PM will be generated by a multitude of construction activities and this shall be further exacerbated by the arid nature of the surrounding environment. Activities with direct earth movement such as land levelling can generate a significant amount of dust and other activities can result in indirect generation of dust. For example, it may be generated by the movement of HGVs and other vehicles along unpaved tracks and operation of the batching plant.

The dust will primarily represent a nuisance to construction personnel. Respirable dust can impact directly on human health, due to its physical penetration into the lungs.

Dust raised during construction activities is likely to settle in close proximity to where the activity is being carried out and impacts are expected to be temporary and contained. Dust impacts are also expected to be managed effectively with GIIP and therefore are not expected to result in significant impacts.

#### 6.4.1.2 Gaseous Emissions

The main sources of gaseous emissions to air during construction will be the combustion of fossil fuels from the operation of vehicles, construction equipment (including diesel generators) and mobile plant. Any emissions from these sources are not expected to result in noticeable incremental impacts to the local airshed as the relatively limited emissions will mix in ambient air close to the point of origin resulting in emissions that are not distinguishable from the background concentrations. The key air pollutants associated with these sources include nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO) and sulphur dioxide (SO<sub>2</sub>).

If improperly managed, there is a risk of nuisance and health effects to construction workers onsite. As with dust generation, impacts are expected to be reversible, temporary, contained and easily managed with GIIP.

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#### **6.4.1.3 Emissions of VOCs and Odour**

VOCs and odour emission resulting from improper handling of chemicals and improper storage of wastewater are not expected to be of significance and will be successfully managed by GIIP.



POTENTIAL IMPACT	MAGNITUDE	RECEPTOR	SENSITIVITY	POTENTIAL IMPACT SIGNIFICANCE	MITIGATION AND MANAGEMENT MEASURES	RESIDUAL IMPACT
<b>Construction</b>						
Construction Dust	<b>Minor Negative</b>	Construction Workers	<b>Low</b>	<b>Negligible</b>	<ul style="list-style-type: none"> <li>Land grading, excavations and movement of uncovered waste/materials should be undertaken during periods of low winds (&lt;15 km/h wind speed is recommended as a threshold to review the situation on-site for these works).</li> <li>Vehicle speeds on all non-public site access and internal site roads will be restricted to 20 km/h.</li> <li>Where sand and other dusty materials are transported, trucks will not be overloaded and will be appropriately covered to avoid losses en-route.</li> <li>Cement and other fine powders will be sealed or covered, stored and transported in enclosed or banded containers.</li> <li>Dusty material stockpiles (i.e., any fine sands and powders), dust generating activities (e.g., stone cutting) are to be located away from the site boundaries and be contained or covered with suitable netting to avoid dust dispersion during storage or use.</li> <li>Vehicle routes will be clearly demarcated and appropriate signage displayed around the site.</li> <li>Daily (or more frequent depending on conditions) wetting/damping down of demarcated unpaved site roads to reduce dust generation.</li> <li>The provision of a wheel-washing facilities or high-pressure hose to ensure all vehicles leaving the site are in a satisfactory state of cleanliness, will also be provided.</li> <li>No fires or burning of wastes will be allowed.</li> </ul>	<b>Negligible</b>
Gaseous Emissions	<b>Minor Negative</b>	Construction Workers	<b>Low</b>	<b>Negligible</b>	<ul style="list-style-type: none"> <li>Site construction roads will be designated and made clear to the drivers with signage for directions and speed limits placed all along the roads.</li> <li>Demarcated site roads will be compacted to reduce vehicular power and related fuel consumption.</li> <li>Unnecessary usage of vehicles, plant and equipment will be minimised. No unnecessary idling.</li> <li>Where practical, deliveries of equipment/plant to the site will be efficiently managed to reduce the number of trips.</li> <li>Exhaust emissions from Project plant and vehicles will be subject to acceptance checks for authorisation of use on site. This includes a pre-requisite requirement of site vehicles to ensure no black smoke before entering site and that any identified machinery or vehicles with black smoke will require maintenance and re-assessment before it is returned.</li> </ul>	<b>Negligible</b>    <b>Negligible</b>

POTENTIAL IMPACT	MAGNITUDE	RECEPTOR	SENSITIVITY	POTENTIAL IMPACT SIGNIFICANCE	MITIGATION AND MANAGEMENT MEASURES	RESIDUAL IMPACT
					<ul style="list-style-type: none"> <li>Lorries and truck engines will be turned off while waiting on site to minimize gaseous emissions. Air-conditioned or heated shelters should be provided for drivers in designated waiting, loading and unloading areas to prevent drivers waiting in vehicles.</li> <li>Emissions from machinery and equipment should be free from significant black smoke.</li> </ul>	
Emission of VOCs and Odour	<b>Negligible Negative</b>	Construction Workers	<b>Medium</b>	<b>Negligible</b>	<ul style="list-style-type: none"> <li>Hazardous materials stored and used on site with potential vapour emissions (e.g. Volatile Organic Compounds) will be located in well-ventilated, but secure low-risk areas, away from key site routes and away from the site boundary (where possible).</li> <li>Volatile fuels and chemicals (including hazardous wastes) will be stored in sealed containers. On site storage of large quantities of volatile fuels will be avoided, equally prolonged exposure to direct sun and heat will be avoided.</li> <li>Temporary chemical and hazardous materials (and waste) storage areas will be purpose built and well maintained. A data log of all chemicals with MSDSs will be provided at the storage facility within easy access.</li> <li>Adequate and sufficient sanitary facilities for site workers must be provided.</li> <li>Effective cleaning and maintenance of toilets to be undertaken to avoid odour dispersion and cleaning records/inspection sheets displayed in the toilets.</li> <li>All septic tanks must be sealed and fully functioning.</li> <li>Septic tanks must be operated and maintained according to manufacturer recommendations.</li> <li>Sanitary waste will be removed from site by licensed contractors and disposed in wastewater treatment facilities approved by the applicable regulator.</li> </ul>	<b>Negligible</b>

## 6.5 Monitoring

Significant air quality impacts are not expected and therefore the following monitoring methods are deemed to be suitable for the construction phase of the Project. No monitoring is proposed for the operation phase.

**Table 6-7 Air Quality – Monitoring Requirements**

MONITORING	PARAMETER	FREQUENCY & DURATIONS	MONITORING LOCATION
<b>Construction</b>			
Dust Generation	PM <sub>2.5</sub> PM <sub>10</sub>	Visual observation for dust emissions to be undertaken on a daily basis during dust generating activities by use of checklist.  To be monitored quantitatively if generation is considered to be excessive or complaints are received.	Along access road alignment and in construction locations
Emissions from engines and plant.	Vehicle Emissions	Pre-site authorisation checks on vehicle status and health, including associated emissions.  Visual assessment of emissions to be undertaken on a daily basis while vehicles and equipment are in use and annual inspection of vehicles.	All non-road vehicles and engines
Sanitary Facilities & Hazardous Material Storage Areas	Odour & VOCs	Daily visual and olfactory observations – as part of maintenance and inspection checks (for hygiene, safety and appropriate storage/containment).	All sanitary facilities available within the laydown areas, sub-contractor camps and work fields. All hazardous material, chemical and fuel storage areas.

## 7 NOISE AND VIBRATION

### 7.1 Applicable Requirements & Standards

#### 7.1.1 National Standards

##### SANPIN No. 0267-09

This law sets out the acceptable noise levels for habitable areas both inside and outside of buildings in Uzbekistan as shown in the table below.

**Table 7-1 Noise Limits under SanPiN No.0267-09**

LOCATION	TIME	LIMIT
Noise levels in premises of residential, public buildings and on the territory of residential areas	07:00 – 23:00	55 dB(A)
	23:00 – 07:00	45 dB(A)

##### SANPIN No. 03225-16

This law aims to protect the health of the staff and workers in the workplace. The law represents noise levels for a variety of internal and external application as shown in the table below.

**Table 7-2 Work Environment Noise Limits**

TYPE OF WORK, WORKPLACE	LIMIT
Performing all types of work on the permanent workplaces in industrial premises and in the enterprises	80 db(A)

##### SANPIN No. 0339-16

These rules and regulations are applicable to the design of new and renovated urban and rural settlements and include basic hygienic requirements for their layout and development.

**Table 7-3 Noise Limits under SanPiN No. 0339-16**

LOCATION	TIME	LIMIT
Areas directly adjacent to residential buildings, recreation centres, pioneer camps, retirement and nursing homes for the disabled and elderly, and pre-schools	07:00 – 23:00	55 dB(A)
	23:00 – 07:00	45 dB(A)

#### 7.1.2 Lender Requirements

##### EBRD

The European Commission Environmental Noise Directive (Directive 2002/49/EC) relating to the assessment and management of environmental noise is the main EU instrument to identify noise pollution levels and to trigger the necessary action both at Member State and at EU

level. The Directive applies to noise to which humans are exposed, particularly in built-up areas, in public parks or other quiet areas in an agglomeration, in quiet areas in open country, near schools, hospitals and other noise-sensitive buildings and areas. It is important to note, however, that the Directive does not set limit or target values, nor does it prescribe the measures to be included in the action plans, thus leaving those issues at the discretion of the competent Member State authorities.

## EPFIs

EPFIs are likely to require adherence to WHO noise standards as detailed in World Bank EHS Guidelines (2007), as shown in the following figure.

**Table 7-4 World Bank Ambient Noise Level Guidelines**

RECEPTOR	ONE HOUR LAEQ DB(A)	
	DAYTIME (07:00 – 22:00)	NIGHT (22:00 – 07:00)
Residential, Institutional, Educational	55	45
Industrial, Commercial	70	70

These relates to receptors and not the plant boundary. Noise impacts should not exceed the levels presented above, or result in a maximum increase in background levels of 3 dB(A) at the nearest sensitive receptor location off-site.

Furthermore, the following requirements have also been specified in the WBG EHS noise guidelines:

- No employee should be exposed to a noise level greater than 85 dB(A) for duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).
- The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound level reaches 140 dB(C), or the average maximum sound level reaches 110 dB(A). Hearing protective devices provided should be capable of reducing sound level at the ear to at least 85 dB(A).
- For every 3 dB(A) increase in sound levels, the allowed exposure period or duration should be reduced by 50%.
- Where feasible, use of acoustic insulating materials isolations of the noise source and other engineering controls should be investigated and implemented prior to the issuance of hearing protection devices as the final control mechanism.
- Medical hearing checks on workers exposed to high noise levels should be performed periodically.

## NOISE REQUIREMENTS FOR WIND PROJECTS

The World Bank/IFC EHS Guidelines for Wind Projects include information relevant to the EHS aspects of onshore and offshore wind energy facilities.

For operational phase noise, the IFC Guideline for Wind Energy include principles for the assessment of sound from wind turbines, which include the following (WBG/IFC, 2015):

- Receptors should be chosen according to their environmental sensitivity (human, livestock or wildlife);
- Preliminary modelling should be carried out to determine whether more detailed investigation is warranted. The preliminary modelling can be as simple as assuming hemispherical propagation (i.e., the radiation of sound, in all directions, from a source point). Preliminary modelling should focus on sensitive receptors within 2,000 meters (m) of any of the turbines in a wind energy facility;
- If the preliminary model suggests that turbine noise at all sensitive receptors is likely to be below an LA90 to 35 dB(A) at a wind speed of 10 meters/second (m/s) at 10m height during day and night times, then this preliminary modelling is likely to be sufficient to assess noise impact; otherwise, it is recommended that more detailed modelling be carried out, which may include background ambient noise measurements;
- All modelling should take account of the cumulative noise from all wind energy facilities in the vicinity having the potential to increase noise levels;
- If noise criteria based on ambient noise are to be used, it is necessary to measure the background noise in the absence of any wind turbines. This should be done at one or more noise-sensitive receptors. Often the critical receptors will be those closest to the wind energy facility, but if the nearest is also close to other significant noise sources, an alternative receptor may need to be chosen; and
- The background noise should be measured over a series of 10-minute intervals using appropriate wind screens. At least five of these 10-minute measurements should be taken for each integer wind speed from cut-in speed to 12 m/s.

The above principles are referenced from the following key guidance documents:

- ETSU, Report ETSU-R-97 "The Assessment & Rating of Noise from Wind Farms" 1997.
- Institute of Acoustics (IOA) "A Good Practice Guide to the Application of ETSU-R-97 for the Assessment & Rating of Wind Turbine Noise" 2013.
- D. McLaughlin "Wind Shear and its Effect on Wind Turbine Noise Assessment" Acoustic Bulletin, July/August 2012, 39-42.

## VIBRATION GOOD PRACTICE GUIDELINE

Good practice vibration exposure limits and action values are stated in guidance issued by the American Conference of Governmental Industrial Hygienists (ACGIH), which advises threshold limit values for both hand-arm vibration and whole-body vibration.

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## 7.2 Baseline Conditions

### 7.2.1 Overview

There are no significant anthropogenic sources of noise and vibration within 8 km of the Project site. In the broader area, traffic on the A380, and the mining and cement operations are the primary sources of noise and vibration. However, noise from these facilities is not expected to be discernible at site.

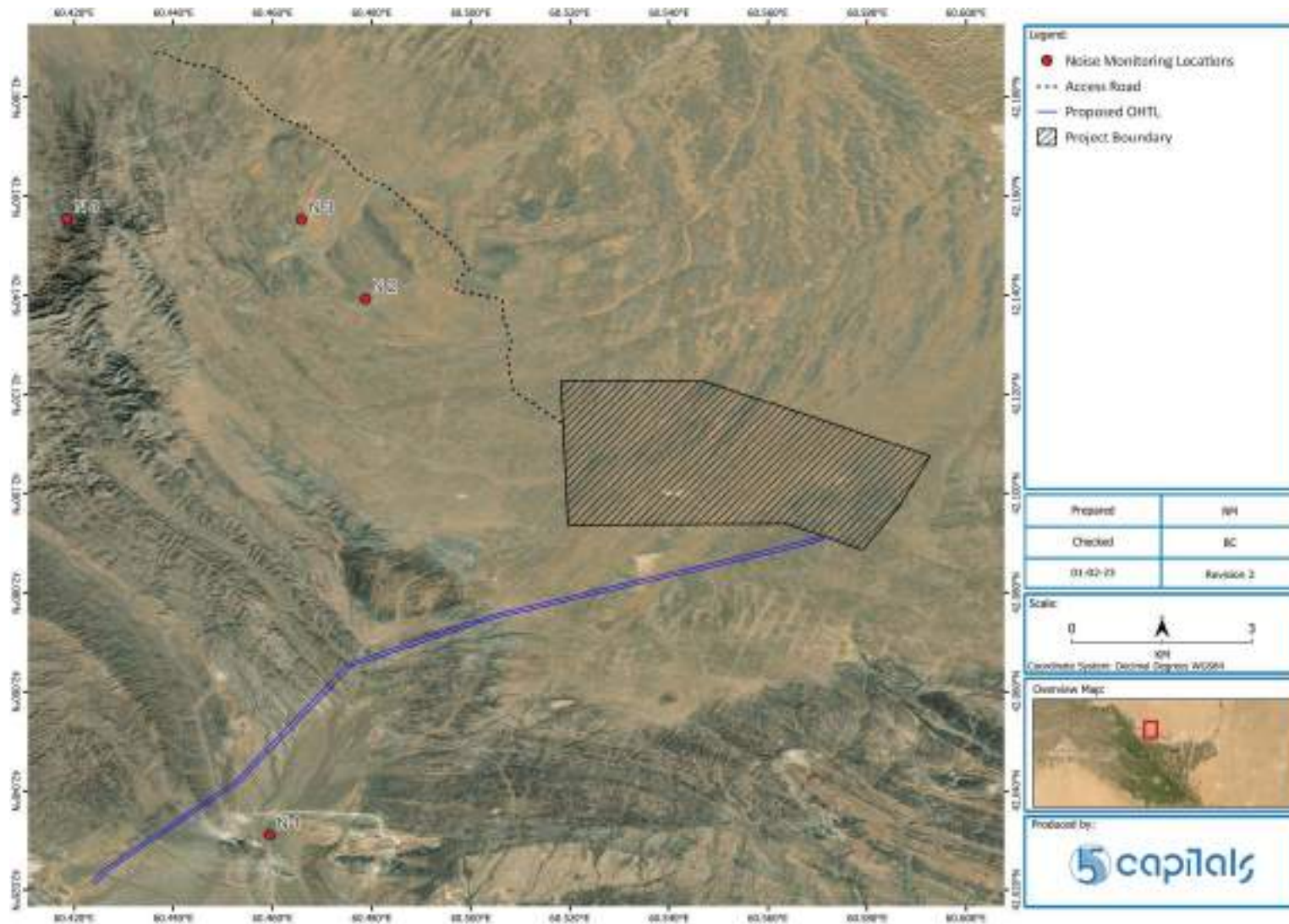
During the site visit in December 2021 the site was noted to be incredibly quiet with a lack of any noise sources apart from the movement of wind.

### 7.2.2 Baseline Noise Survey

A noise measurement campaign was undertaken at four locations in February 2022. The locations of noise monitoring are shown in the following figure and further described in the following table.



Due to the lack of noise sources within the allocated boundary of the WTG, measurements were taken at receptor locations. Measurements at locations N-2 and N-3 can be considered relevant to noise levels within the WTG site boundary due to the general lack of noise sources.







**Figure 7-1 Noise Monitoring Locations**

**Table 7-5 Noise Monitoring Locations**

ID	DESCRIPTION	PHOTO
N1	Near to the two cement factories and located >1 km from the proposed OHTL route.	
N2	Near to the meteorological mast and the social receptor guarding the mast (S-2).	

ID	DESCRIPTION	PHOTO
N3	At the location of the summer herder shelter (S-1), approximately 1.4 km from the proposed access road.	
N4	Close to the existing operational mining facilities.	

10-minute noise measurements were taken continuously for 24 hours at each location using a Class 1 Sound Level Meter (SLM) located on a tripod approximately 1.2 – 1.5 m from the ground height. An anemometer was located adjacent to the SLM.

The following tables and figures outline the results of the noise measurement campaign.

The results are all compliant with the limits established in the WHO and national noise standards and the national standards.

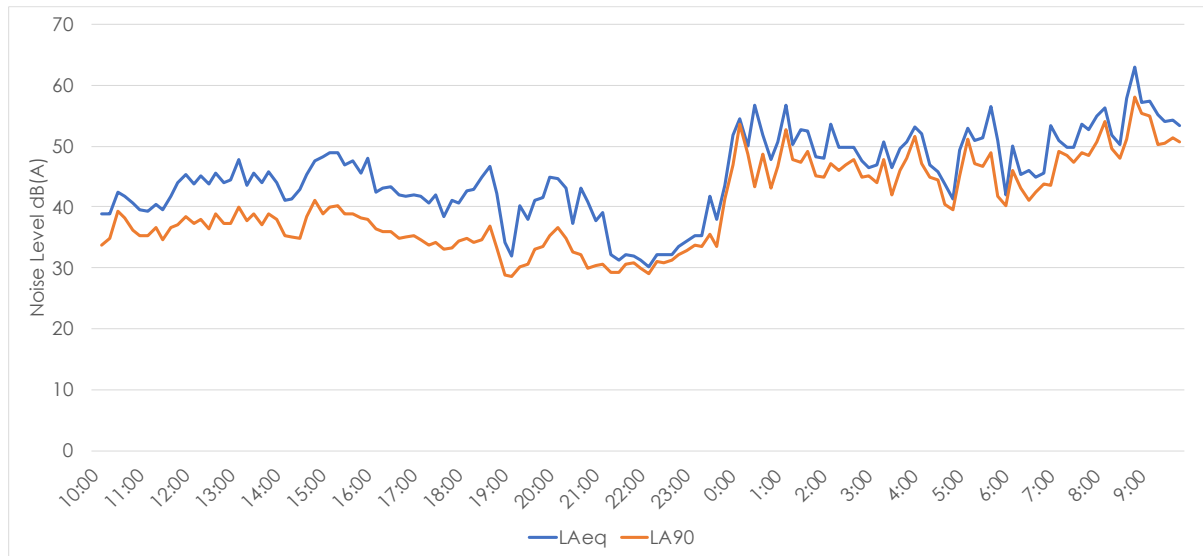
**Table 7-6 Baseline Noise Monitoring Results**

ID	24-HOUR LAEQ	DAYTIME LIMIT	DAYTIME LAEQ 07:00 – 22:00	NIGHTTIME LIMIT	NIGHTTIME LAEQ 22:00 – 07:00
N1	49.8	70	49.7	70	50.0
N2	36.1	55	40.0	45	25.3
N3	46.3		47.7		42.4
N4	45.9	70	48.0	70	32.4
<p>Notes:</p> <p>The WHO standard defines daytime as 07:00 – 22:00 while the national standard defines daytime as 07:00 – 23:00.</p> <p>Both the WHO and national standard limits residential noise at 55 (daytime) and 45 (nighttime) LAeq dB(A).</p> <p>The national standards do not define limits for industrial areas and therefore the limit for industrial receptors as defined in the WHO standards have been provided for N1 and N4.</p>					

Further analysis of the recorded noise levels is provided in the following subsections.

## N1

N1 is located next to the two cement factories. The recorded  $LA_{eq}$  was highest at this location relative to the three other monitoring locations. Interestingly, noise levels rise at around 00:00 and stay higher throughout the night until the next morning.



**Figure 7-2 Noise Levels at N1**

When comparing  $LA_{eq}$  noise levels to average wind speed, as shown in the following figure, it is evident that noise levels are somewhat correlated to wind speed, corroborating the lack of noise sources and influence of wind. When wind speeds were  $<5$  m/s, around 20:00 to 23:00, the noise levels were typically in the low to mid-30 dB(A) range.

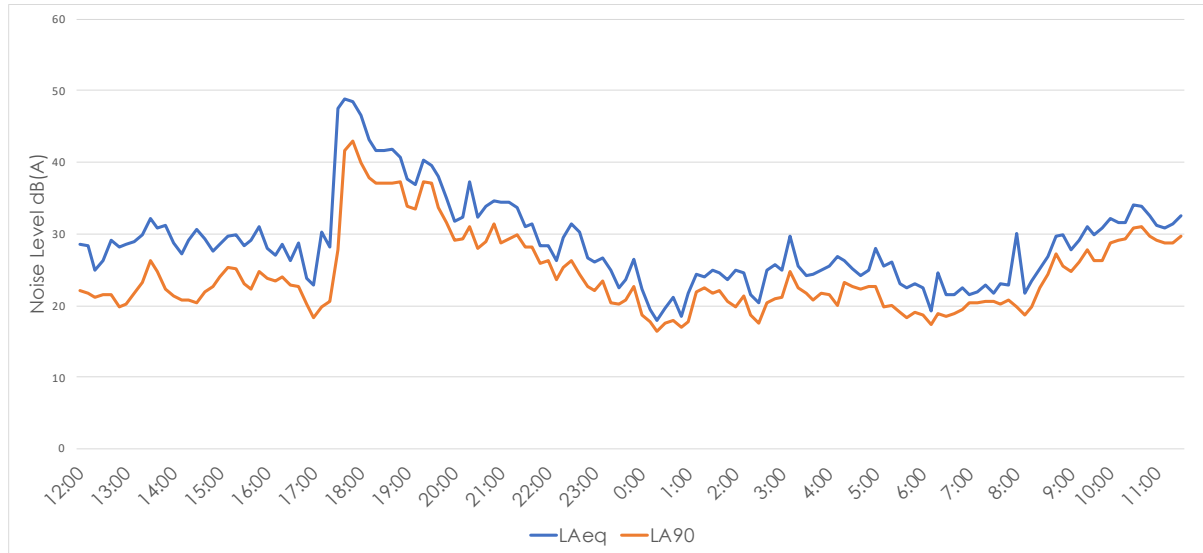


**Figure 7-3 Noise and Wind Speed at N1**



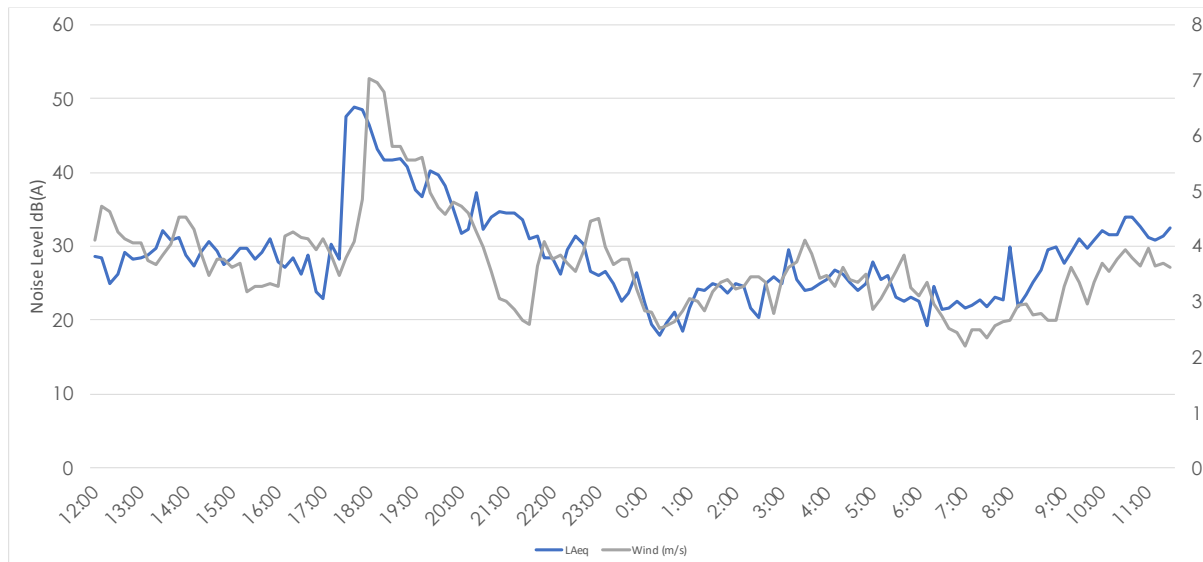
## N2

N2 is located next to the meteorological mast and the shelter guarding the mast. The 24-hour LA<sub>eq</sub> reading was the lowest here of the four monitoring locations. Noise levels peaked around 17:00 and then gradually decreased until 01:00 before stabilising before morning.



**Figure 7-4 Noise Levels at N2**

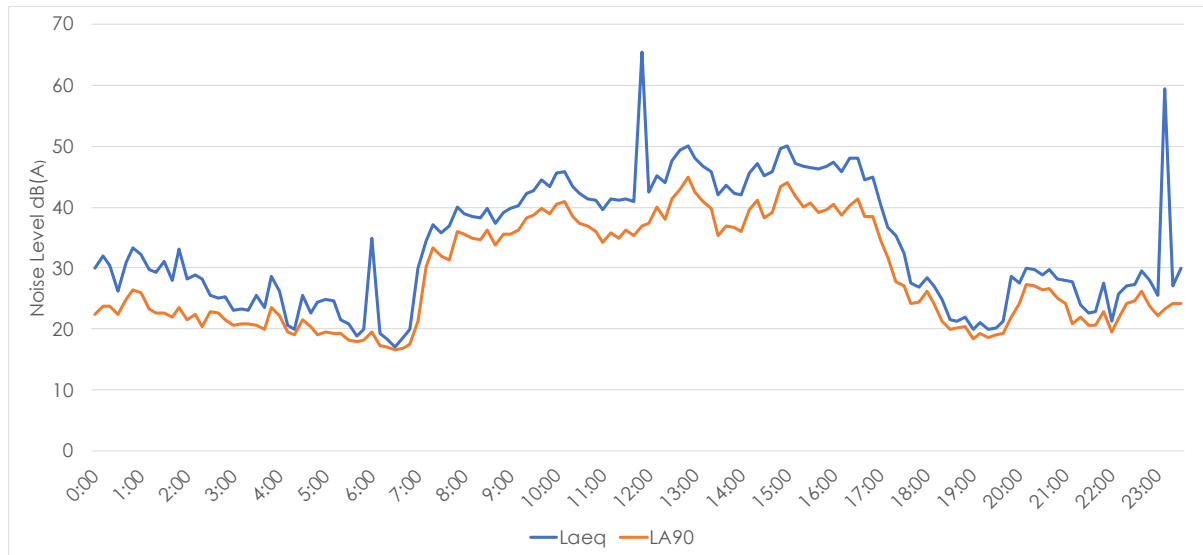
Similarly to N1, noise levels were found to correlate to wind speed, as shown in the following figure, indicating that the primary source of noise at this location is the wind.



**Figure 7-5 Noise and Wind Speed at N2**

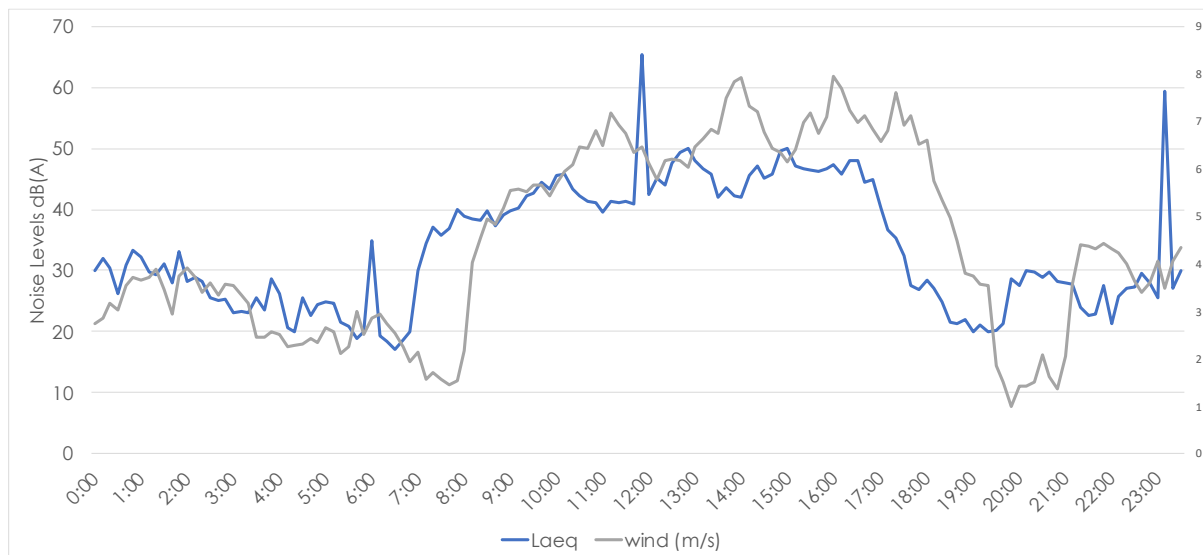
### N3

At the location of the summer herder shelter (S-1), approximately 600 m from the proposed access road. The noise levels are low in the early morning and evening and higher in the middle of the day. There are three peaks of the LAeq evident across the 24-hour period, however, upon reviewing the LA90 results it is clear that these are intermittent and do not impact background noise levels.



**Figure 7-6 Noise Levels at N3**

The recorded noise levels were also largely correlated to wind speed, as shown in the following figure.

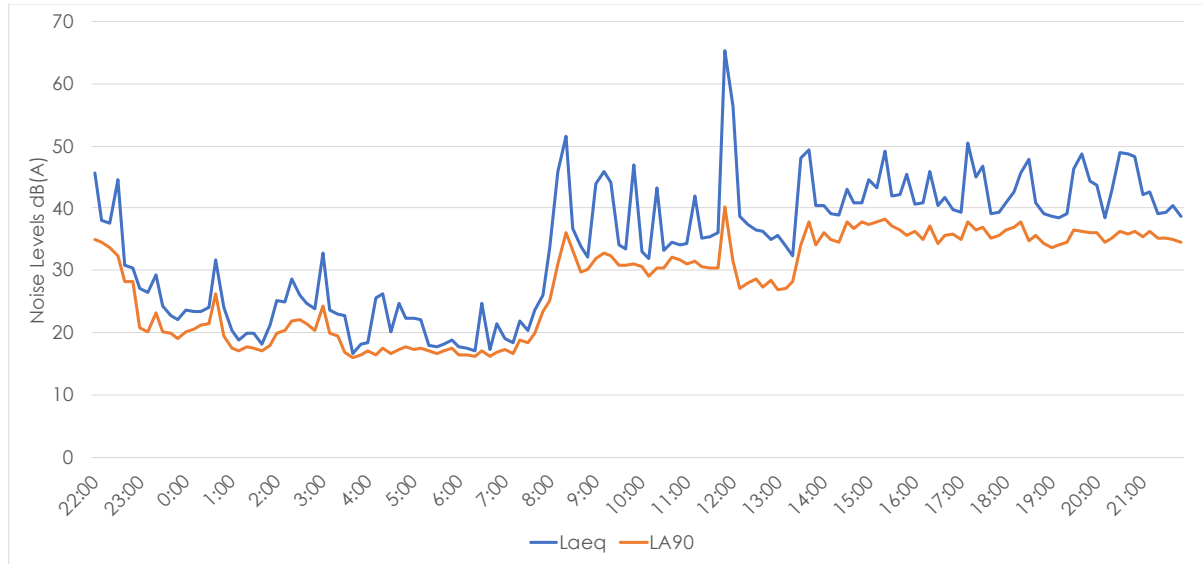


**Figure 7-7 Noise and Wind Speed at N3**



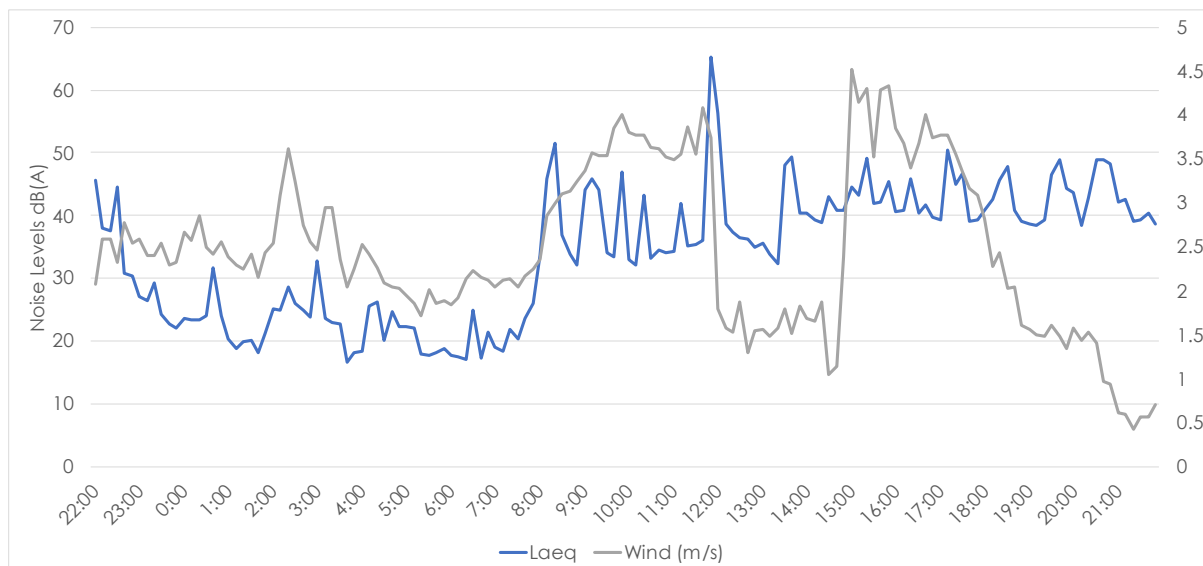
## N4

N4 is located close to the existing operational mining facilities. Low levels are observed until around 08:00 and then frequent intermittent peaks are observed throughout the rest of the day until monitoring finishes (after 21:00) it is considered likely that these peaks are related to the nearby mining operations.



**Figure 7-8 Noise Levels at N4**

Further supporting this theory is the following image which shows less correlation between wind speed and noise levels when compared to the other three sites.



**Figure 7-9 Noise and Wind Speed at N4**

To conclude, the baseline noise survey shows that wind speed is the primary factor determining noise levels at three of the four sites, and this is not unexpected due to the lack of noise sources in the surrounding areas and the high average wind speeds. Noise levels within the boundary of the land allocated for the WTGs is also expected to be solely influenced by wind speed.

The noise monitoring closest to the mining operations is influenced by the mining activities and this is reflected in the recorded noise levels.

## 7.3 Area of Influence and Receptors

### 7.3.1 Area of Influence

#### CONSTRUCTION PHASE

Propagation of sound from a source depends on a number of factors such as the level and frequency, type of terrain, distance, weather conditions and barrier effects. Under free field conditions, noise from a point source will attenuate with increased distance. Barriers and obstacles in the Project site, such as topographical features will also influence how sound is transmitted. The area of influence is anticipated to be localised and conservatively limited to within 1000 m of the construction footprint, including access roads (both Project specific and general) and the OHTL route during the construction phase.

#### OPERATION PHASE

In relation to noise impacts during operation, the expected range of impacts are likely to be within 2 km of any WTG (based on WBG/IFC EHS Wind Energy recommendation). The following figure depicts a 2 km buffer from the site boundary of the land allotted for the WTGs.

Operational noise has been 'scoped in' although there are no receptors within 3.5 km, this has been adopted as a precautionary approach to ensure due diligence with respect to operational noise impacts. The preliminary modelling also allows for an understanding of the noise levels decrease with distance from turbines.

Vibration impacts are not expected during the operation phase.

### 7.3.2 Receptors

The following figure depicts the existing noise sensitive receptors to the Project. As is evident from the figure, the only noise sensitive receptor within the area of influence is the Karakalpak Cement LLC Facility (Receptor ID: I-1) which is located towards the most southerly point of the OHTL alignment.

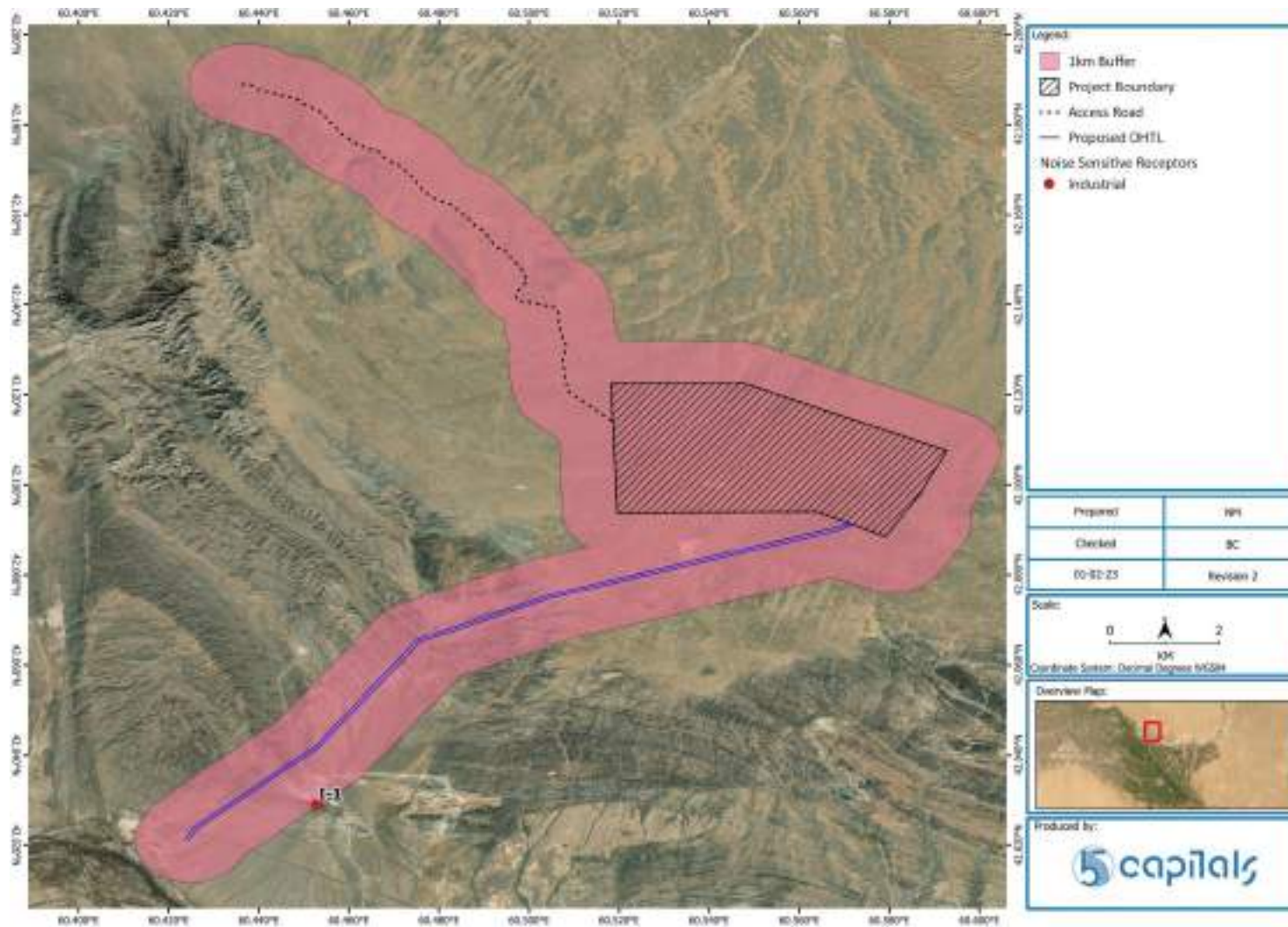


Figure 7-10 Construction Noise Sensitive Receptors

Construction workers have also been considered as a receptor to noise impacts, however, it is recognised that the workers will be provided with PPE during the onboarding process and/or site induction.

There are two mining areas for the cement factories within 1 km of the OHTL route, however, these are not considered as noise sensitive receptors.

**Table 7-7 Receptor Sensitivity to Noise Impacts**

RECEPTOR	SENSITIVITY	JUSTIFICATION
Karakalpak Cement LLC Facility (Receptor ID: I-1)	Low	As an industrial facility, Karakalpak Cement is considered to be of low sensitivity to noise impacts. In addition, it is expected that the workforce would be located within the centre of facility rather than on the outskirts, closest to Project construction works.
Construction workforce	Low	The construction workforce will be supplied for PPE to manage potential noise impacts arising from the Project.

With respect to operational noise from turbines, the following figure depicts the 2 km buffer from the boundary of the land allotted for the WTG, as is evident there are no noise sensitive receptors within the area of influence.



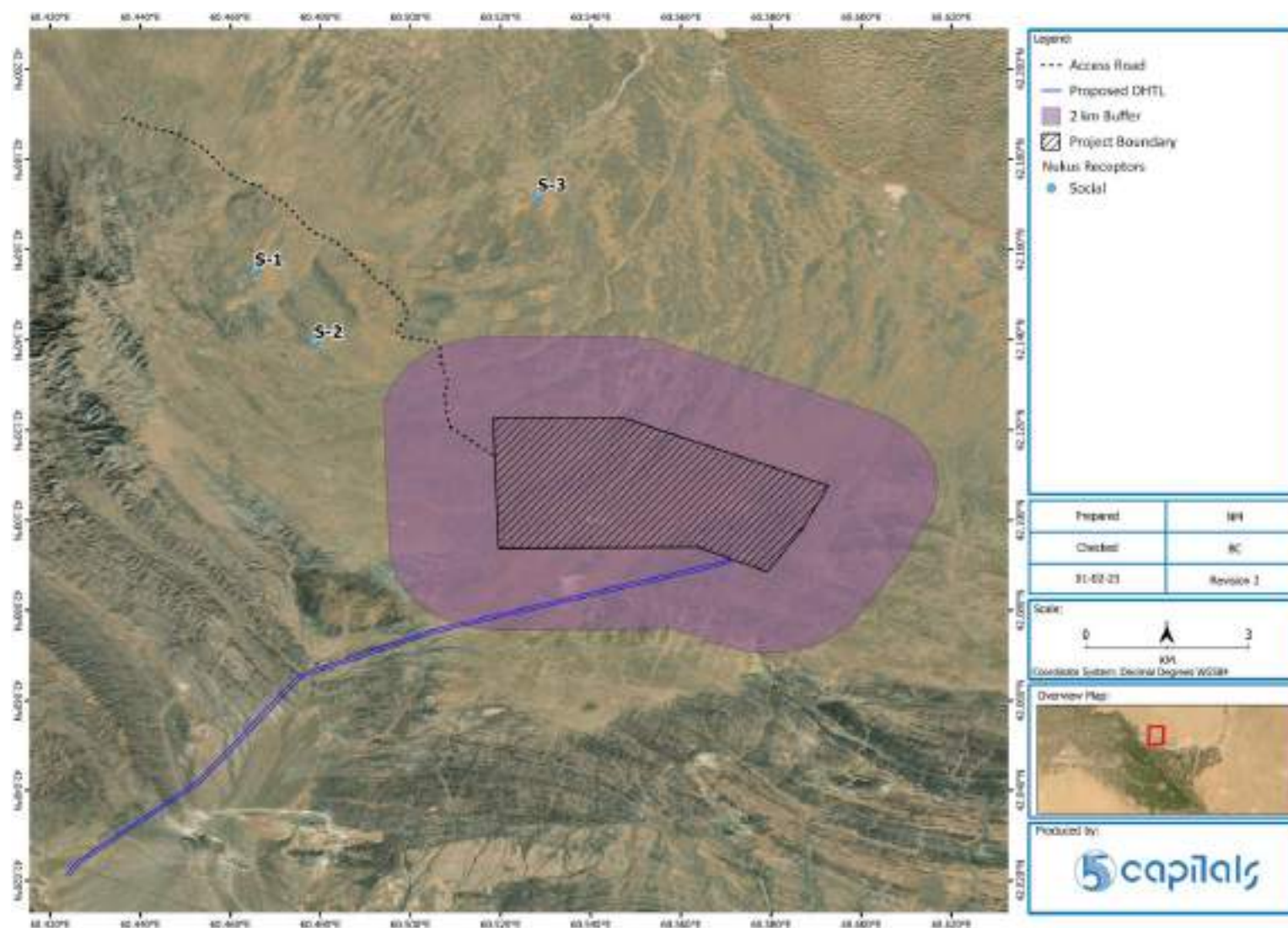


Figure 7-11 Operational Noise Buffer Zone

## 7.4 Potential Impacts, Mitigation, Management & Residual Impacts

### 7.4.1 Construction Phase

#### 7.4.1.1 Construction Site Noise and Vibration

##### NOISE

The spatial extent of construction noise will typically be local, and largely limited to within the immediate surroundings of the works. The duration of the impact will be short considering individual noise emission events relative to the lifespan of the project. The frequency of occurrence is high as noise emissions will likely occur daily, but noise emissions are reversible once the activity ceases.

Construction activities for the Project will result in temporary and short duration increases in noise and vibration levels. Pertinent construction activities at the project site in relation to noise are likely to include:

- Access road preparation / construction for the transport of turbines to the site;
- Site Preparation (e.g. earthworks, compaction);
- Foundation construction;
- Vehicle movements, particularly the transport of the turbines to site;
- Turbine erection; and
- Foundation works and erection of OHTL route.

The accumulation of noise from the above sources can introduce potential cumulative impacts when generated in tandem.

The anticipated construction equipment/machinery to be used at the site for various construction activities together with noise data for this equipment are presented in the following table as obtained from 'BS 5228-1:2009 - British Standards: Code of practice for noise and vibration on construction and open sites'.

**Table 7-8 Noise Level of Typical Construction Equipment**

CONSTRUCTION ACTIVITIES	BS 5228-1:2009 REFERENCE	EQUIPMENT	SPL dB (A)
<b>Site clearance</b>	Table C.2, 5	Tracked Excavator (16t)	76
<b>Earthworks</b>	Table C.2, 13	Dozer (11t)	78
	Table C.2, 19	Tracked Excavator (25t)	77
	Table C.2, 28	Wheeled Loader	76
	Table C.2, 38	Roller (18t)	73
<b>Piling and Foundation</b>	Table C.3, 9	Piling (10t)	63

CONSTRUCTION ACTIVITIES	BS 5228-1:2009 REFERENCE	EQUIPMENT	SPL dB (A)
<b>General site activities</b>	Table C.4, 2	Articulated Dump Truck (23t)	78
	Table C.4, 15	Fuel tanker Lorry (11t)	76
	Table C.4, 22	Large Concrete Mixer (26t)	76
	Table C.4, 40	Mobile Telescopic Crane (80t)	66
	Table C.4, 65	Tracked Excavator (21t)	71
	Table C.4, 84	Diesel Generator	74
<b>Road construction</b>	Table C.5, 20	Vibratory Roller	75
	Table C.5, 31	Asphalt Paver	77
<b>Cumulative Total (Equipment on 50% of the Working Day)</b>			<b>83.8</b>

The predictions assume that each piece of equipment will only be operational for 50% of the working day. The predictions also work on the basis that all of the equipment is located at the same location at the boundary of the site (as a worst-case assumption).

A basic modelling assessment using equations set out in Annex F of 'BS5228-1:2009 Part 1 Noise' has been used to predict the effects of distance propagation and ground absorbance. The adjustment due to ground absorbance has been made based on all nearby receptors being >25m from source and using the equation ' $25 \cdot \log_{10}(\text{Distance to receptor}) + 2$ '.

The noise calculation on receptors within the area of influence is presented below with adjusted noise levels from the Project's construction accounted for with distance attenuation. Representative baseline noise from noise survey conducted has been used to estimate the worst-case cumulative noise level that can be expected at each of the receptors.

Only one receptor is located within the construction noise area of influence. Karakalpak Cement LLC facility (Receptor ID: I-1) is located approximately 1 km from the OHTL and, as a worst-case scenario, the cumulative noise during the noisiest construction activity 'General Site Activities' has been assessed. The construction noise from 'General Site Activities' is 79.6 dB(A)

**Table 7-9 Cumulative Construction Noise Assessment**

RECEPTOR	BASLINE NOISE LEVEL (DBA)	DISTANCE FROM SOURCE (M)	ANTICIPATED CONSTRUCTION NOISE AT RECEPTOR LOCATION (DBA)	CUMULATIVE NOISE LEVEL (DBA)	CHANGE FROM BASELINE (DBA)
Karakalpak Cement LLC facility (Receptor ID: I-1)	49.8	1000	31.6	49.9	+0.1

Paragraph E.3.2 of BS5228 describes the ABC Method, which considers the existing ambient noise environment (the  $L_{Aeq}$  noise level environment) at the neighbouring sensitive receptors and identifies levels that if exceeded would be considered to result in a significant adverse effect and is noted to apply to residential receptors only.



Table E.1 of BS5228 sets out significance effect threshold values at receptors. The process for determining this requires the determination of the ambient noise level at the relevant receptor (rounded to the nearest 5 dB), which is then compared to the total noise level, including the predicted construction noise level. If the combined noise level exceeds the appropriate category value, then the impact is deemed to be significant. The relevant statistics from Table E.1 are set out in the below table.

**Table 7-10 Construction Phase Noise – ABC Assessment**

ASSESSMENT CATEGORY AND THRESHOLD VALUE PERIOD ( $L_{Aeq}$ )	THRESHOLD VALUE, IN DECIBELS - dB(A)		
	CATEGORY A	CATEGORY B	CATEGORY C
Daytime (07:00 to 19:00 hrs) and Saturdays (07:00 to 13:00 hrs)	65	70	75
Evenings & Weekends	55	60	65
Night-time (23:00 to 07:00 hrs)	45	50	55
NOTE 1 A significant effect has been deemed to occur if the total $L_{Aeq}$ noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level.			
NOTE 2 If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total $L_{Aeq}$ noise level for the period increases by more than 3 dB due to construction activity.			
NOTE 3 Applied to residential receptors only. A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values. C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.			

**Note:** The ABC Method does not provide levels of significance, as such professional judgement has been applied to determine this within applicable significance tables.

Karakalpak Cement LLC facility (Receptor ID: I-1) is an industrial facility and only an increase of 0.1 dB(A) is expected due to the construction works. Noise impacts on I-1 are therefore not deemed significant and not considered further.

In addition, increased noise levels can impact upon construction workers, however, construction personnel who will be conducting noisy works will be provided with the required training and PPE.

## VIBRATION

Vibration impacts are not expected on receptors apart from Construction Workers due to the distance. Vibrations, even of very low magnitude can be perceptible to people, and can

cause nuisance, anxiety and noise impacts on structures (e.g., windows rattling). Any vibratory impacts will be temporary and reversible.

#### **7.4.1.2 Vehicular Noise**

Construction of the Project will require movement of vehicles to the site (i.e., along access roads). Construction activities and the transportation of WTG components to site requires the use of HGVs and therefore noise impacts can be expected adjacent to the access road. However, impacts are expected to be negligible due to the fact that the majority of the construction workforce will be staying at the accommodation camp onsite and, due to the extent of construction required, there is not the need for frequent deliveries or collections. In addition, no receptors are located within 1 km of the access road.

### **7.4.2 Operation Phase**

#### **7.4.2.1 Noise from WTG**

During the operation of the WTGs, noise will be generated from mechanical and aerodynamic sources. Both mechanical and aerodynamic noise may result in propagation to areas within 2 km of the WTG. Mechanical noise is radiated by the surface of the turbine and by openings in the nacelle housing and will emanate from generator, gearbox, yaw drives etc. These components produce their own characteristic noise. Aerodynamic noise will be produced by the flow of air over the blades.

Noise from wind turbines vary with wind speed. The sound power level of wind turbines increases with higher wind speed due to the increase in rotation speed of the turbine blades.

#### **INITIAL SCREENING STUDY**

The WBG/IFC EHS Guidelines for Wind Energy (2015) set the following screening criteria for wind farms:

*"Preliminary modelling should be carried out to determine whether more detailed investigation is warranted. The preliminary modelling can be as simple as assuming hemispherical propagation (i.e., the radiation of sound, in all directions, from a source point). Preliminary modelling should focus on sensitive receptors within 2,000 meters of any of the turbines in a wind energy facility.*

*If the preliminary model suggests that turbine noise at all sensitive receptors is likely to be below an LA90 of 35 decibels (dB) (A) at a wind speed of 10 meters/second (m/s) at 10 m height during day and night times, then this preliminary modelling is likely to be sufficient to assess noise impact; otherwise it is recommended that more*

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*detailed modelling be carried out, which may include background ambient noise measurements."*

Although there are no receptors within 2 km of any WTG, an initial screening was undertaken to ensure a robust assessment of potential risks.

The calculation methodology for assessment purposes is outlined in International Standard ISO 9613-2:1996 ('Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation'). The standard specifies an engineering method for calculating noise at a known distance from a variety of sources under meteorological conditions favourable to sound propagation. The standard defines favourable conditions for light downwind propagation where the wind blows from all the turbines to the receiver(s) within an angle of +/-45 degrees from a line connecting each turbine to each receiver, at wind speeds between approximately 1 m/s and 5 m/s, measured at a height of 3 to 11 m above the ground. Equivalently, the method accounts for average propagation under a well-developed moderate ground based thermal inversion. In this respect, it is noted that at the wind speeds relevant to noise levels from wind turbines, atmospheric conditions do not favour the development of thermal inversions throughout the propagation path from the source to the receiver.

The general calculation method considered the following attenuation corrections:

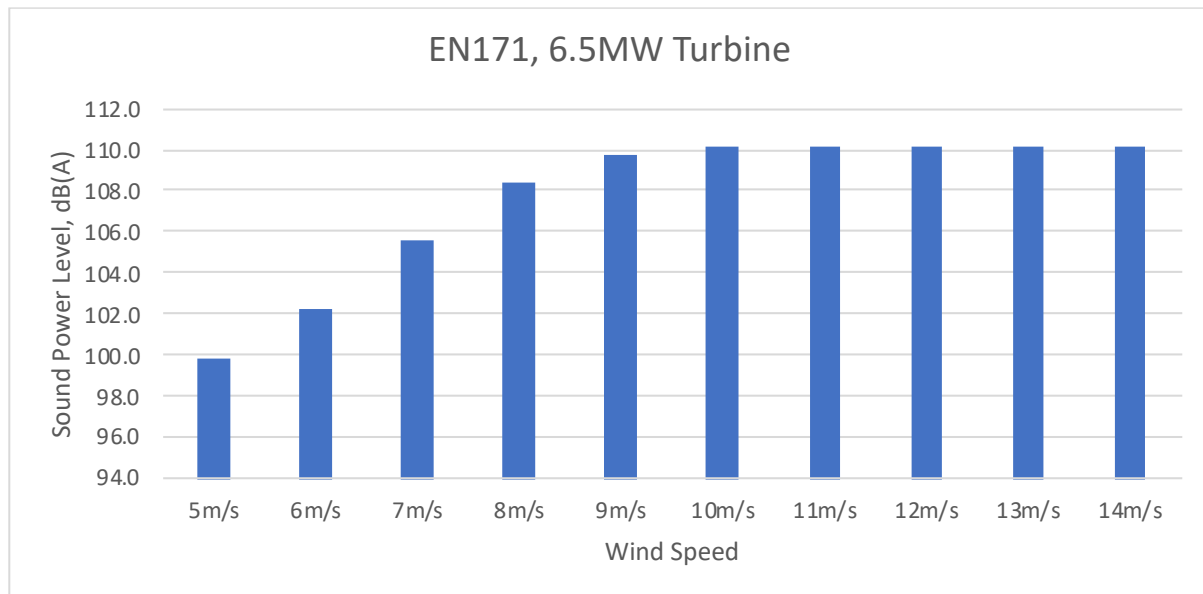
- Geometric divergence
- Air absorption
- Reflecting obstacles
- Screening
- Vegetation
- Ground reflections

Attenuation due to the above factors was applied to the sound power levels of the noise sources to derive the resulting noise levels at the receptors.

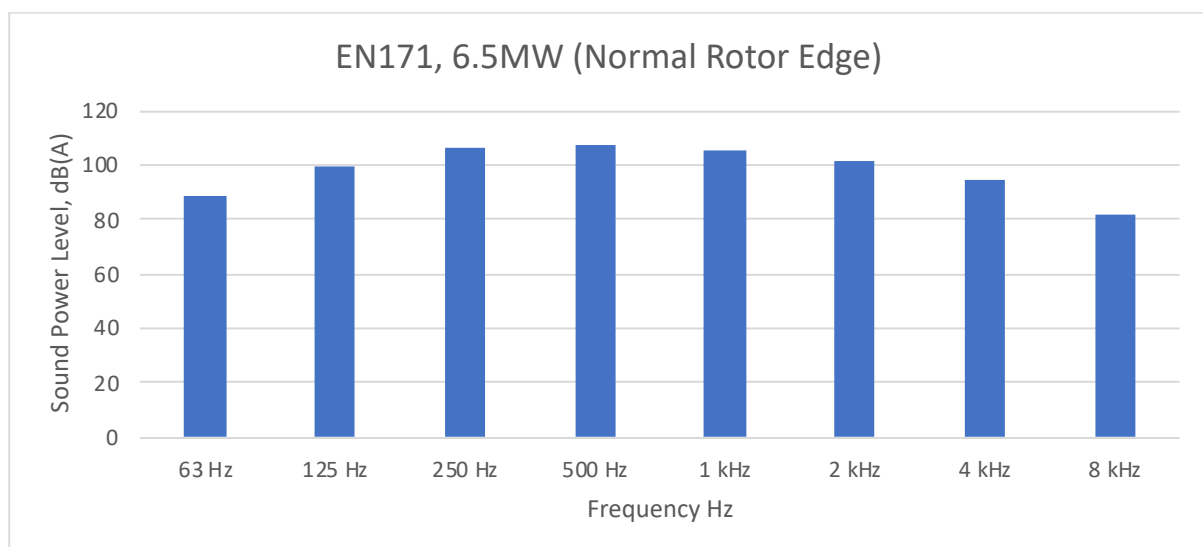
Wind turbines are sound sources with special characteristics, such as wind speed dependent sound power levels, high source heights etc., which require special considerations. These parameter adjustments are chosen in combination to give a more reliable calculation methodology. Refer to **Volume 4** of the Final ESIA for the full noise model report.

#### Turbine Data

The following data was supplied by the manufacturers.



**Figure 7-12 EN171 6.5 MW – Sound Power Level**



**Figure 7-13 EN171 6.5 MW – Octave Data (10 m/s)**

The WBG/IFC guidance does not consider other factors such as tonality, impulsiveness and amplitude modulation. It is understood from the turbine manufacturers' advice that such factors will not be an issue for receptors beyond 300 m from the nearest turbine (there are no receptors within 300 m of the turbine).

#### Calculation of Noise Levels at Receptors

Noise levels at the receptors has been calculated using the noise-modelling suite IMMI2021, in accordance with the ISO 9613 prediction methodology.

In addition to the uncertainty adjusted turbine sound power levels used in the calculations, the model also considers the effects of the topographical conditions throughout the area as well

as applying a light downwind propagation correction to represent a worst-case. The model considers the noise 'emission' of each turbine and calculates the accumulative noise level at each receptor in accordance with the ISO9613 methodology.

The results of the noise model are shown in the following table.

**Table 7-11 Noise Levels at Receptors**

RECEPTOR	NEAREST TURBINE	DISTANCE TO NEAREST TURBINE (M)	NOISE LEVELS AT RECEPTORS LA90,T DB					
			5 M/s	6 M/s	7 M/s	8 M/s	9 M/s	>10 M/s
Summer Settlement (S-1)	NU-01	5,819	14.6	17.1	20.4	23.3	24.7	25.0
Guard House for the Meteorological Mast (S-2)	NU-01	3,897	19.3	21.8	25.1	28.0	29.4	29.7
Winter Settlement (S-3)	NU-02	5,591	16.8	19.2	22.6	25.4	26.8	27.1

Noise contours at 5 m/s and 10 m/s respectively are presented in the following figures.

As can be seen from the table and figures, there are no exceedances of the initial study criteria and therefore further studies are not required. The assessed sensitive receptors do not exceed the IFC initial screening criteria and therefore mitigation measures are not necessary.

For reference purposes, the noise level at the closest receptor, S-2, for the turbines operating at >10 m/s wind speed (which has the lowest baseline noise level at 36.1 dB(A)) would result in a cumulative noise level which would only increase by approximately 1 dB(A). It should also be noted that the noise output of a turbine varies with the wind speed and therefore the noise climate attributable to the wind farm will not always be at a worst-case output at 10 m/s or greater.





Figure 7-14 Noise Contours at 5 m/s





#### 7.4.2.2 Other Operational Noise

Besides noise from the operation of WTGs, the movement of operations and maintenance vehicles and the potential low magnitude humming from the electrical transformers (which is not expected be discernible at over 50 m and therefore there are no receptors within the area of influence) are potential sources of noise.

Given the minimal requirements for maintenance activities during operation, and due to the limited operational workforce, noise impacts from vehicles are also not expected to be significant and are not discussed further. Nor are potential noise impacts from electrical transforming humming.

As such, no operational noise impacts are deemed to be significant or assessed further.

The following table summarises the impact significance, mitigation measures and residual impacts for noise and vibration impacts.

**Table 7-12 Noise and Vibration Impact Significance, Mitigation Measures and Residual Impacts**

POTENTIAL IMPACT	MAGNITUDE	RECEPTOR	SENSITIVITY	POTENTIAL IMPACT SIGNIFICANCE	MITIGATION AND MANAGEMENT MEASURES	RESIDUAL IMPACT
<b>Construction</b>						
Construction Site Noise	<b>Minor Negative</b>	Construction Workers	<b>Low</b>	<b>Negligible</b>	<ul style="list-style-type: none"> <li>Where possible, nighttime works will not be conducted.</li> <li>The herder will be informed of the timeline of the noisy works, specifically the access road construction works.</li> <li>Third parties will have access to a grievance mechanism to make any complaints regarding noise during the construction phase.</li> <li>The EPC Contractor will carry out all work in such a manner as to keep any disturbance from noise to a minimum.</li> <li>Acoustic covers on machine engines to remain closed at all times (as applicable).</li> <li>Where practical, electrically powered plant will be preferred to mechanically powered alternatives.</li> <li>All mechanically powered plant, diesel engine vehicles and compression equipment will be fitted with noise control equipment (exhaust silencers, mufflers) as available from the manufacturer.</li> <li>Items of plant on site operating intermittently will be shut down in the intervening periods between use.</li> </ul>	<b>Negligible</b>
Vibration	<b>Minor Negative</b>	Construction Workers	<b>Low</b>	<b>Negligible</b>	<ul style="list-style-type: none"> <li>The herder will be informed of the timeline of the works which may result in vibration impacts.</li> <li>Where practical, works that may result in vibration impacts will be kept to the centre of the construction site.</li> <li>Vehicles and mechanical plant will be maintained in good condition to minimise excessive vibration.</li> </ul>	<b>Negligible</b>
<b>Operation</b>						
Following completion of noise modelling and identification of potential operation noise impacts, it has been determined that there is unlikely to be any operational noise impacts of significance as result of the operation of the Project. Therefore, no operational noise mitigation measures are proposed.						

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## 7.5 Monitoring

Significant noise impacts are not expected and therefore the no noise monitoring is proposed. Should any complaints or grievances be received then monitoring will be required for a period following receipt of the complaint

No monitoring is proposed for the operation phase, besides the monitoring of any noise related grievances received.

## 8 GEOLOGY, SOILS AND GROUNDWATER

### 8.1 Applicable Requirements & Standards

#### 8.1.1 National Regulations

Issues related to protection of soils, geology and groundwater in Uzbekistan are regulated by the following legislations:

- SanPiN No.0272-09 Sanitary rules and norms for compiling hygienic justifications for soil protection schemes from pollution in Uzbekistan": The Sanitary Rules and Norms include the basic requirements for development of hygienic justification for the soil protection schemes against pollution, duties and functions of state sanitary supervision bodies in this area.
- SanPiN No.0191-05 Maximum permissible concentrations (MPC) and Approximate allowable concentrations (AAC) of exogenous harmful substances in soil: This defines MPC values of chemicals and pesticides polluting the soil. MPCs and AACs are designed to ensure that there is no negative direct or indirect impact on human health, its future generations and public health through soil contact.
- SanPiN No.0212-06 Sanitary rules and norms for the hygienic assessment of soil contamination of different types of land use: This document provides a unified methodology for hygienic assessment of soil pollution using a nomenclature of indicators of soil hygienic condition, which should be used both in the development of regulatory and technical documentation on the hygiene of soils, and in assessing the degree of its pollution.

#### 8.1.2 Lender Requirements

##### **EBRD**

Performance Requirement 3 on Resource Efficiency and Pollution Prevention and Control establishes general requirements for pollution prevention as follows:

- The assessment process must identify technically and financially feasible pollution prevention and control techniques that are best suited to avoid or minimise adverse impacts on human health and the environment. Such techniques will be appropriate to the nature and scale of the project's adverse impacts and issues; and
- The Project must meet the relevant EU substantive environmental standards, where these can be applied at the project level. Where no EU substantive environmental standards at project level exist, the Project will identify, in agreement with the EBRD, other appropriate environmental standards in accordance with GIP.

##### **EPFIs**

IFC Performance Standard 3 on 'Resource Efficiency and Pollution Prevention' requires the client and/or the Project to:

- Avoid or minimise adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities; and
- Prevent the release of pollutants to water and land due to routine, non-routine, and accidental circumstances, or when not feasible, minimize and/or control the intensity and mass flow of their release.

## GIIP

The Dutch Standards are environmental pollutant reference values (i.e., concentrations in environmental medium) used in environmental remediation, investigation and clean-up. The standards identify maximum allowable concentrations for contaminants in soil and groundwater. The soil intervention values indicate when the functional properties of the soil for humans, plants and animals is seriously impaired or threatened. They are representative of the level of contamination above which a serious case of soil contamination is deemed to exist. Groundwater target values provide an indication of the benchmark for environmental quality in the long term, assuming that there are negligible risks for the ecosystem.

The Dutch Standards for the most significant pollutants are presented in the table below. Where a parameter is not covered by the Dutch Standards, other appropriate international standards shall be used.

**Table 8-1 Dutch Soil and Groundwater Standards**

CONTAMINANT	SOIL/SEDIMENT (MG/KG DRY WEIGHT)		GROUNDWATER (µG/L)	
	TARGET	INTERVENTION	TARGET	INTERVENTION
<b>1. Metals</b>				
Antimony	3	15	-	20
Arsenic	29	55	10	60
Barium	200	625	50	625
Cadmium	0.8	12	0.4	6
Chromium	100	380	1	30
Chromium III	-	180	-	-
Chromium VI	-	78	-	-
Cobalt	9	240	20	100
Copper	36	190	15	75
Mercury	0.3	10	0.05	0.3
Mercury (inorganic)	-	36	-	-
Mercury (Organic)	-	4	-	-
Lead	85	530	15	75
Molybdenum	3	200	5	300

CONTAMINANT	SOIL/SEDIMENT (MG/KG DRY WEIGHT)		GROUNDWATER (µG/L)	
	TARGET	INTERVENTION	TARGET	INTERVENTION
Nickel	35	210	15	75
Zinc	140	720	65	800
<b>2. Other inorganic substances</b>				
Chloride (mg Cl/l)	-	-	100	-
Cyanide (free)	1	20	5	1500
Cyanide (complex)	5	50	10	1500
Thiocyanate	1	20	-	1500

- **Note:** The soil values are calculated for a 'Standard Soil' with 10% organic matter and 25% clay. A case of environmental contamination is defined as 'serious' if >25 m³ soil or >100 m³ groundwater is contaminated above the intervention value.
- **Source:** Soil Remediation Circular 2009, Annex 1: Groundwater target values and soil and groundwater intervention values. (\*Target values for soil refer to 2000 version as they are not present in the 2009)
- Where contaminants are found to exceed 'intervention' levels, this is considered to be a case of soil contamination, which is dangerous to the health of humans and the natural environment. Such a level of contamination should prompt a need for remediation, appropriate treatment and disposal.

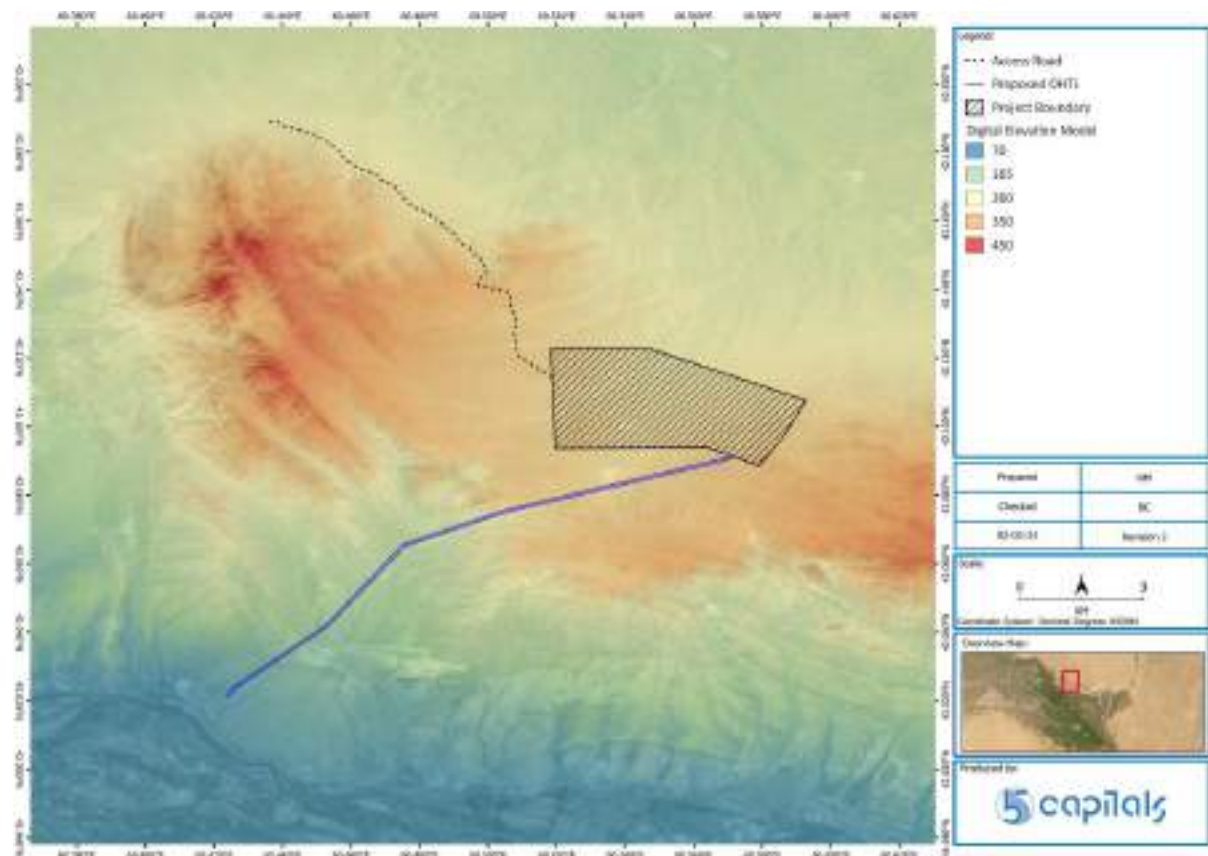


## 8.2 Baseline Conditions

The following information is summarised from the site observations during the December 2021 site visit, the soil sampling survey and subsequent analysis conducted in February 2022 and the geotechnical survey of the site conducted by SpecialGeo (2021).

### 8.2.1 Topography

The site terrain within the boundary of the land allocated for the WTGs is moderately undulating, with elevations ranging between 250 and 345 m above Vertical Reference Datum (Baltic Height System 1977). The digital elevation model as provided in the tender documentation is shown in the following figure. As is evident from the figure, the site is bounded to the south and west by the Karatau hills. The lower elevation of the Amu Darya River basin is also evident.



**Figure 8-1 General Site Topography**

An example of the undulating topography is shown in the following figure.



**Figure 8-2 Undulating Topography**

### 8.2.2 Geology and Soils

The terrain surface conditions were found to be non-complex. The site is a desert (steppe) area with little to no vegetation, only small scrubs and grasses. In the low elevation areas, the shallow geological conditions typically comprise a thick (>30 m) overburden layer of “normal soils” such as dense sands, hard loam and clay soils. In the higher elevation areas, the shallow geological conditions tend to consist of bedrock at or very close to the ground level (<3 m). No special or unique geological or other topographical features were observed during site visits.

Initially, there are no obvious areas of current or past human activity to the land that may have resulted in contamination. Isolated impacts may occur at the seasonally used structures on-site for herders, although these were identified over 3 km away from the wind farm site boundary. In addition to this, at locations close (c. 400 m) to access road alignment near to the main road connecting the A380 to the north (10 km from wind farm site boundary), there are examples of historic exploratory works understood to have been conducted by geologists. These are shown in the following figures.



### Figure 8-3 Historic Geological Exploration Near Access Road

Ground conditions mean the potential for soil erosion and dust generation during the Project construction phase are high.

Soil sampling was conducted at five locations across the site, three locations within the site boundary of the WTGs, one on the access road alignment and one on the OHTL alignment.

**Table 8-2 Soil Sampling Locations**

ID	COORDINATES	DESCRIPTION	IMAGE
S1	42.189798° 60.447786°	Adjacent to the access road alignment, close to identified areas of historic geological exploration	
S2	42.041725° 60.454557°	On the proposed OHTL corridor.	
S3	42.114028° 60.544833°	Located in the central north section of the site boundary for the WTGs.	
S4	42.097640° 60.529456°	Located in the southwest section of the site boundary for the WTGs.	
S5	42.090387° 60.577399°	Located in the southeast section of the site boundary for the WTGs, located close to the location of the proposed substation.	

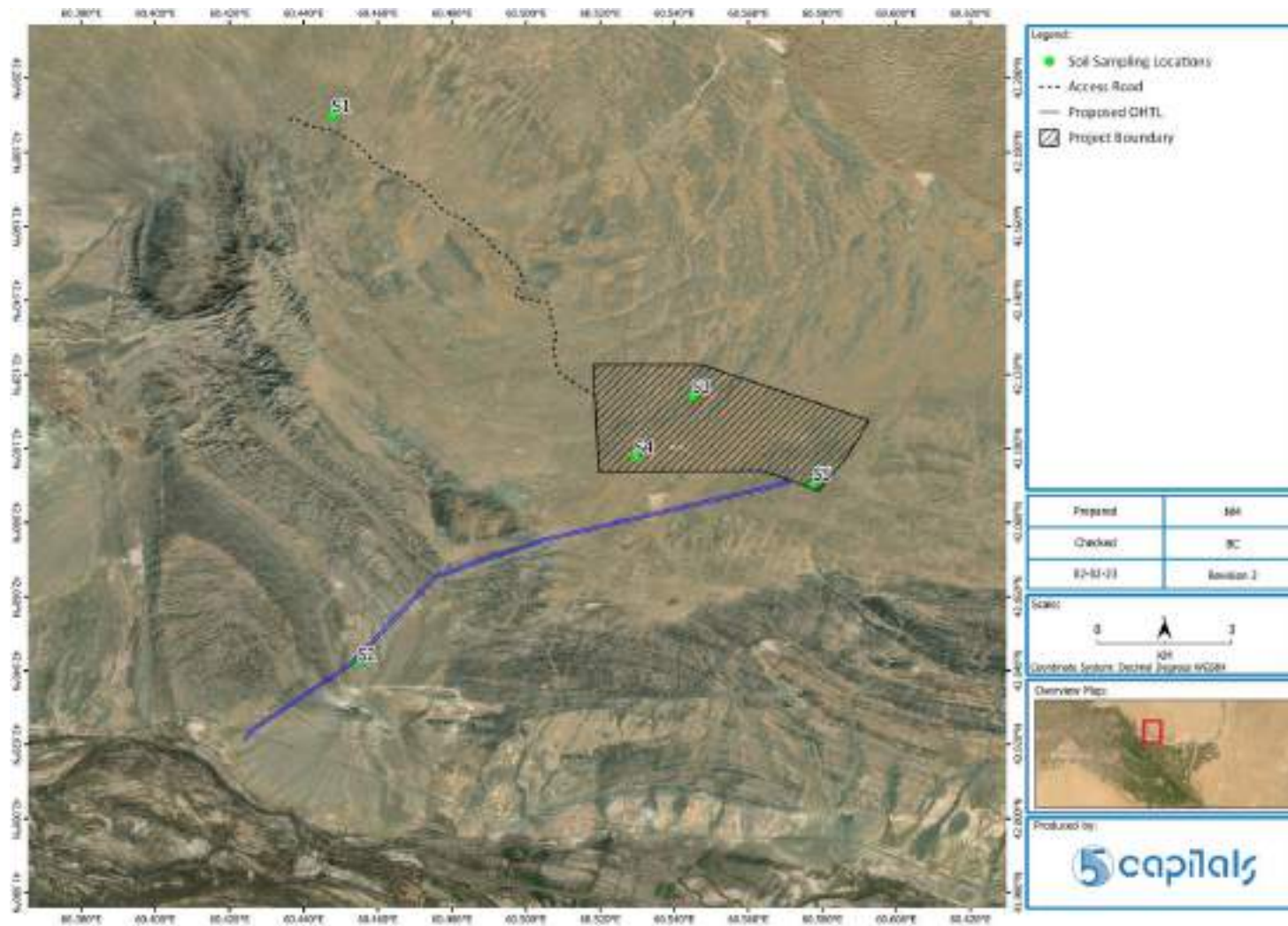
Sampling was conducted between 9<sup>th</sup> and 12<sup>th</sup> February 2022 and was carried out in accordance with the established State standard 17.4.4.02-2017 "Nature protection. Soils. Methods for sampling and preparation of soil for chemical, bacteriological, helminthological analysis".

The samples were then sent to a 'Central Laboratory' in Tashkent for analysis against a range of parameters including chlorides, nitrates and metals.

The results of the analysis are provided in the following table. Despite the distance between the samples, with S1 and S2 approximately 17 km apart, homogeneity is observed between all samples. All samples exhibit similar pH, and all samples exceed the maximum permissible values for copper, zinc, chromium and nickel. The latter three exceed the national permissible values, however, are below the Dutch Intervention Value, however, copper also exceeds the Dutch Intervention Value.

The area is known for its mining potential and therefore the presence of metals in high concentrations is considered to be a natural phenomenon and not as a result of anthropogenic influence. Consultation was conducted with the Central Laboratory regarding the exceedances, and it was explained that high concentrations of metals is expected for the region. In addition, exceedances were observed in all five samples despite the distance between the samples, further indicating that the high concentrations are natural for the region.





**Figure 8-4 Soil Sampling Locations**

**Table 8-3 Soil Analysis Results**

PARAMETERS	SAMPLE					SANPiN № 0191-05 MPC	DUTCH INTERVENTION VALUE
	S1	S2	S3	S4	S5		
pH	8,00	8,00	8,00	8,00	8,00	-	-
Chloride (as Cl), %	0.062	0.054	0.033	0.046	0.034	-	-
Nitrate (NO <sub>3</sub> ), mg/dm <sup>3</sup>	18.00	28.00	15.00	16.00	13.00	130 (gross content)	-
Sodium (Na), mg/kg	12,000	8,600	10,000	8,800	8,900	-	-
Magnesium (Mg), mg/kg	12,000	9,800	6,400	7,000	10,000	-	-
Potassium, mg/kg	16,000	14,000	18,000	19,000	16,000	-	-
Lead (Pb), mg/kg	13.0	22.0	13.0	12.0	12.0	32	530
Manganese (Mn), mg/kg	400	1,000	320	360	380	1,500 (gross content)	-
Copper (Cu), mg/kg	420	420	380	340	340	3	190
Zinc (Zn), mg/kg	45.0	52.0	43.0	43.0	43.0	23	720
Chromium (Cr), mg/kg	89.0	87.0	86.0	85.0	84.0	6	380
Iron (Fe), mg/kg	40,000	73,000	33,000	38,000	69,000	-	-
Mercury (Hg), mg/kg	0.220	0.260	0.220	0.100	0.150	2.1	36
Nickel (Ni), mg/kg	53.0	81.0	42.0	42.0	74.0	4.0	210
Cadmium (Cd), mg/kg	<0.005	0.022	0.017	0.017	<0.005	-	12
Aluminum (Al), mg/kg	49,000	47,000	47,000	48,000	51,000	-	-
Arsenic (As) mg/kg	23.0	37.0	20.0	25.0	40.0	-	55
Key: <span style="background-color: #d4edda;">Green</span> – complies with applicable standards <span style="background-color: #fff3cd;">Yellow</span> – exceeds national standards but not the Dutch intervention value <span style="background-color: #f8d7da;">Red</span> – exceeds both national standard and the Dutch intervention value							

### 8.2.3 Groundwater

No groundwater was encountered during the geotechnical survey in which boreholes and trial pits were dug to depth of 30 m and 4 m below ground level respectively.

A well was observed 2.4 km from the access road alignment, where groundwater was being pumped up to provide drinking water for livestock, as shown in the following figure.



**Figure 8-5 Groundwater Pumping for Livestock**

Based on consultations with the herder who owns the groundwater well, the well is used only for the livestock, and drinking water is brought from Karatau village. Groundwater was not sampled and analysed due to the fact that the Project has limited pollution sources and pathways to groundwater as a receptor.

### 8.2.4 Seismic Hazard

According to ThinkHazard<sup>2</sup>, the seismic hazard levels within the region are generally classified as 'low' with a 2% chance of a potentially damaging earthquake occurring in the next 50 years.

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<sup>2</sup><https://thinkhazard.org/en/report/39766-uzbekistan-karakalpakstan-karauzyak-district/EQ>



## 8.3 Area of Influence and Receptors

### 8.3.1 Area of Influence

The scope of the geology, soil and groundwater assessment includes the construction and operation activities that may impact these parameters. The study boundaries are limited to the areas outlined in the table below.

Operation impacts for geology, soil and groundwater have been scoped out of further discussion (see Section 1.4).

**Table 8-4 Geology, Soil and Groundwater Area of Influence**

PHASE	PARAMETER	AREA OF INFLUENCE AND STUDY AREA
Construction	Geology, Soil & Groundwater	<ul style="list-style-type: none"> <li>Areas within the footprint of construction activities including WTG locations, access roads, OHTL and associated temporary facilities.</li> <li>For groundwater this may also include areas where groundwater can migrate.</li> </ul>

### 8.3.2 Receptors

For the purpose of assessing the magnitude of potential impacts to geology, soil and groundwater, the criteria provided in the following tables has been used to determine the sensitivity of receptors.

**Table 8-5 Geology and Soil Receptor Sensitivity**

SENSITIVITY	DESCRIPTION
High	<ul style="list-style-type: none"> <li>Highly vulnerable to physical disturbance, structurally prone to compaction or erosion and taking over 10 years to recover.</li> <li>Highly leachable.</li> <li>The soil provides substrate that has the physical qualities and degree of productivity to support a variety of plants including the development of important and/or indigenous species of flora and fauna.</li> <li>The soil is intrinsically linked to the hydrological cycle and plays a key ecosystem role in water regulation.</li> <li>Water saturated soils (Wetland soils).</li> </ul>
Medium	<ul style="list-style-type: none"> <li>Vulnerable to physical disturbance, structurally prone to compaction or erosion but able to recover within a period of 10 years.</li> <li>Moderately leachable.</li> <li>The soil provides substrate that has the physical qualities and the degree of productivity to support a variety of plants including the development of flora and fauna in some abundance and levels of diversity.</li> <li>The soil has some capacity for water retention and plays some role in the hydrological cycle in terms of the degree of water regulation and as a substrate for channelling run off.</li> </ul>
Low	<ul style="list-style-type: none"> <li>Shows resilience to physical disturbance, structurally prone to compaction and erosion.</li> <li>The soil constitutes no favourable substrate for the development of floral habitats and other fauna.</li> </ul>

SENSITIVITY	DESCRIPTION
	<ul style="list-style-type: none"> <li>The soil plays little or no role in the hydrological cycle or regulation of water.</li> </ul>
Very Low	<ul style="list-style-type: none"> <li>Completely resilient to physical disturbance and /or impermeable to contamination</li> </ul>

**Table 8-6 Groundwater Receptor Sensitivity**

SENSITIVITY	DESCRIPTION
High	<ul style="list-style-type: none"> <li>Groundwater aquifer is used for community water supply. Water supply wells located within 1 km of the project activity areas.</li> <li>Extensive groundwater dependent wetland areas.</li> <li>Internationally designated biodiversity site with water dependency</li> </ul>
Medium	<ul style="list-style-type: none"> <li>Groundwater aquifer not used as the primary source, used for individual supplies or for non-potable uses located within 1 km of the project activity areas</li> <li>Nationally designated protected site with water dependency</li> <li>Groundwater is shallow</li> </ul>
Low	<ul style="list-style-type: none"> <li>Groundwater in unconsolidated aquifer.</li> <li>Community or other water supply well located more than 1 km from project activity area.</li> </ul>
Very Low	<ul style="list-style-type: none"> <li>Groundwater aquifer is non-potable use more than 1 km from project activity areas.</li> <li>Non-potable quality groundwater, present at considerable depths.</li> </ul>

Based on the above criteria, for both construction and operational phases, the following sensitivity values are assigned, with further justification for the assigned status:

**Table 8-7 Geology, Soil and Groundwater Sensitive Receptors**

RECEPTOR	SENSITIVITY	JUSTIFICATION
Site Soils	Low	The soil constitutes no favourable substrate for the development of floral habitats and other fauna, the soil plays little or no role in the hydrological cycle or regulation of water.
Groundwater Quality	Medium	The groundwater is used for livestock, with a well located within 400 m of the access road alignment.

## 8.4 Potential Impacts, Mitigation, Management & Residual Impacts

This section presents the likely impacts and effects on the site geology, soil and groundwater due to the construction of the Project. The Project site is deemed to be of low risk to seismic events, as stated previously, and therefore no assessment of seismic impacts has been undertaken.

### 8.4.1 Construction Phase

Construction works including site preparation, civil works such as foundations and installation of WTG and OHTL structures and associated activities will result in interactions with site geology and may affect chemical and physical properties of the local soil and, although considered unlikely due to the depth, potentially groundwater quality.

#### 8.4.1.1 Ground Compaction

The construction stage of the Project will entail movement of heavy vehicles and machinery along open ground for transporting materials, construction workforce and the WTG which can result in soil compaction. In addition, the civil works for the installation of WTG will require ground compaction.

Alteration in soil structure from ground compaction works results in lower permeability of the immediately underlying soil and a breakdown of soil aggregates. Soil compaction has an indirect impact on surface water flows and any groundwater recharge, due to reduced soil permeability / water infiltration.

This impact is largely inevitable, however, it is important to note that the areas that will be primarily be impacted (such as WTG footprint) are distinct, e.g., the WTG are typically >850 m from each other, and the vast majority of the 1,678-hectare area allotted for WTG development will be left undeveloped. The impact is considered to be of moderate magnitude.

Impacts can be mitigated by ensuring that construction is limited to the required footprints.

There are no areas of geological significance within the site, therefore impacts on site geology are not assessed to be significant.

#### 8.4.1.2 Alteration of Soil and Groundwater Quality

The assessment of potential impacts on soil and groundwater quality follows a conceptual model approach based on potential linkages of pollution sources via pollution pathways to receptors.

##### ASSESSMENT METHODOLOGY

A risk-based approach is used, focusing on activities which could lead to contamination or physical interference/changes, to assess the potential environmental impacts and their effects.

Impacts have been assessed based on a conceptual site model which uses the source-pathway-receptor approach. Construction activities themselves can result in contamination, principally due to spillages and poor waste management. Applicable source, pathway and receptor considering soil and groundwater risks include the following:

- Source
  - Fuel and hydrocarbons
  - Chemicals
  - Wastes including hazardous wastes
  - Groundwater abstraction
- Pathway
  - Surface soil (direct contact)
  - Subsurface volatilisation
  - Groundwater (direct contact)
- Receptor
  - Site soil
  - Local aquifer
  - Human receptors

Risks from soil contamination are present only if a source, pathway and receptor are present and if there is a linkage between all three.

There are no freshwater resources in the Project area. Potential impacts on groundwater quality will be similar to those identified for soil quality as both are interconnected, and the sources of impacts are widely similar. Impacts on groundwater through pollution are therefore indirect or secondary to soil quality.

##### Source

Construction of the Project and associated facilities will entail the use of plant and machinery which require fuel. This fuel will be stored at site which is a potential source of contamination.

Other sources of potential soil and groundwater contamination include the operation of the batching plant and use of typical construction related chemicals and hydrocarbons which could include:

- Paints, thinners and adhesives;
- Hydrocarbons such as lubricating oil, hydraulic oil, shutter oil and grease; and
- Hazardous wastes such as spent oil and chemical containers containing residue.

The volume of these materials has not been confirmed at the time of writing and will depend on the storage and logistical arrangements set forth by the construction contractors.

#### Pathway

An assessment of primary exposure pathway has been developed for the site based on the current understanding of hydrogeology and existing land use conditions. This is summarised in the following table.

**Table 8-8 Primary exposure pathways**

<b>PATHWAY</b>	<b>COMPLETE/INCOMPLETE/PLAUSIBLE</b>
<b>Groundwater Ingestion</b> (incl. soil leaching) - direct ingestion including cooking using groundwater	<b>Onsite – Incomplete</b> No groundwater wells for human consumption are present.
<b>Domestic Non-Drinking Use of Groundwater</b> (incl. soil leaching) – non-potable domestic groundwater use assuming inhalation and dermal contact exposure.	<b>Onsite – Plausible</b> A groundwater well is located close to the access road alignment, and it is understood that the water from the well is used for livestock.
<b>Surface Soil Direct Contact</b> - simultaneous ingestion, dermal & inhalation of volatiles & particulates from surface soils	<b>Onsite – Plausible</b> Construction workers may come in direct contact when working in areas where contaminated soil is present. The extent of contact can be minimised by use of PPE.
<b>Groundwater Direct Contact</b> (any depth, within excavation only) - Ingestion, Dermal Contact, Inhalation of Volatiles and Particulates by construction worker	<b>Onsite – Incomplete</b> Groundwater at site is likely deeper than 30 m and therefore it is unlikely that there will be any direct contact.

Based on the above table the likely human exposure pathways relate to direct contact to surface and subsurface soil and the extraction of groundwater for livestock.

It is expected that hazardous material and waste storage will occur primarily within dedicated storage areas. Although the potential exists for hazardous materials to be released into the environment in the case of leakage or a spill, spills are likely to occur only at locations such as storage areas, fuel dispensing areas and workshops. Such impacts are due to human error or

failure of equipment and can therefore be mitigated through the deployment of double-walled storage containment, bunds and spill trays. Suitable spill kits will also be distributed at hazardous materials locations throughout the site. The CESMP will include a spill management plan which will detail the control measures that will be adopted.

Sanitary wastewater including sewage generated from toilets and other onsite facilities will be collected in temporary holding tanks until removal by wastewater tankers. Such structures will be built and maintained to prevent leaks which could cause soil contamination.

Impacts to soil likely to be temporary, reversible and localised and therefore are of minor magnitude. It is considered unlikely that any pollution event could result in impacts to groundwater due to the groundwater depth and the likely scale of pollution event and therefore impacts to groundwater are of negligible magnitude.



**Table 8-9 Geology, Soil and Groundwater Impact Significance, Mitigation Measures and Residual Impacts**

POTENTIAL IMPACT	MAGNITUDE	RECEPTOR	SENSITIVITY	POTENTIAL IMPACT SIGNIFICANCE	MITIGATION AND MANAGEMENT MEASURES	RESIDUAL IMPACT
<b>Construction</b>						
Ground compaction	<b>Moderate Negative</b>	Site Soils	<b>Low</b>	<b>Minor</b>	<ul style="list-style-type: none"> <li>Any excavation and compaction works will be limited to the footprint required.</li> <li>Construction traffic will be limited to dedicated routes.</li> <li>The natural ground will be left undisturbed between WTG as far as reasonably practicable.</li> </ul>	<b>Negligible</b>
Alteration of soil and groundwater quality	<b>Minor Negative</b>	Site Soils	<b>Low</b>	<b>Minor</b>	<ul style="list-style-type: none"> <li>EPC Contractor will develop a Hazardous Material Storage and Handling Procedure identifying locations of hazardous material (including waste) storage, storage requirements and handling procedures.</li> <li>Storage of all hazardous materials such as fuels and chemicals on an impermeable base with liners and/or secondary containment bund with enough capacity to hold 110 % of the maximum volume stored.</li> <li>All chemicals/materials will be stored according to manufacturer's instructions and Material Safety Data Sheets (MSDS).</li> <li>Suitable containment and spill clean-up materials/equipment will be available locations within the construction area in which potential contamination is possible site (e.g., chemical storage areas).</li> <li>Relevant personnel will be trained on emergency and spill response, containment, material handling and storage procedures.</li> <li>Fuel transport vehicles and equipment will be maintained and routinely inspected to ensure the tank, pumps, pipe work and vehicle itself are free from any leaks and fit for purpose. No equipment will be placed in service until deficiencies are corrected.</li> </ul>	<b>Negligible</b>
	<b>Negligible Negative</b>	Groundwater Quality	<b>Medium</b>	<b>Minor</b>	<ul style="list-style-type: none"> <li>All machines using oils or hazardous substances will have drip trays underneath to capture any leaks or drips.</li> <li>The construction workforce will be trained to be able to identify signs of potential contamination (e.g., staining, smell of hydrocarbons etc.).</li> <li>A regular maintenance program will be implemented for vehicles and equipment to minimise leaks or mechanical failures and keep document evidence.</li> <li>No storage of hazardous chemicals, materials, oils or fuels within 100 m of unprotected stormwater drains/channels.</li> <li>A project CESMP and associated Waste Management Plan and Procedures will be implemented to ensure that spills are kept to a minimum and are cleaned up quickly using spill kits located in risk areas.</li> </ul>	<b>Negligible</b>

POTENTIAL IMPACT	MAGNITUDE	RECEPTOR	SENSITIVITY	POTENTIAL IMPACT SIGNIFICANCE	MITIGATION AND MANAGEMENT MEASURES	RESIDUAL IMPACT
					<ul style="list-style-type: none"> <li>A hazardous waste inventory will be developed and maintained to document and track hazardous wastes generated, and their disposal route.</li> <li>Good housekeeping practices will be ensured during construction activities including procedures and requirements for proper handling, storage, and transport of hazardous materials and waste.</li> <li>The EPC Contractor and sub-contractors will provide induction training and Toolbox Talks (TBTs) relating to the management, transportation and handling of hazardous materials and wastes</li> <li>Washing of equipment, machinery and vehicles will only be permitted in designated areas, with impermeable surfaces and dedicated drainage systems that lead to separate sumps or, treatment facilities and/or lined evaporation ponds.</li> <li>If contaminated soils are observed during construction activity, the identified contaminated soil should be excavated separately, and stored or disposed of in accordance with the waste management plan as hazardous waste, to avoid cross-contamination.</li> <li>Any imported soils brought to the site will be from accredited quarries with certificate of quality.</li> </ul>	

## 8.5 Monitoring

Significant residual impacts are not expected and therefore the following monitoring methods are deemed to be suitable for the construction phase of the Project. No monitoring is proposed for the operation phase.

**Table 8-10 Geology, Soils and Groundwater – Monitoring Requirements**

MONITORING	PARAMETER	FREQUENCY & DURATIONS	MONITORING LOCATION
<b>Construction</b>			
Soil Quality	Visible spills & leaks and olfactory observations of hydrocarbons and other potentially hazardous or chemical pollution sources	Daily visual observations as part of a checklist	All construction areas, chemical and waste storage areas, temporary construction areas and along the access roads.

## 9 HYDROLOGY AND SURFACE WATER

### 9.1 Applicable Requirements & Standards

### 9.2 Baseline Conditions

#### HYDROLOGY

The Project area is part of the Amu-Darya hydrographic network, the Amu-Darya River passes more than five km from the closest point on the OHTL route and over 15 km from the nearest WTG, shown diagonally on the following image.



**Figure 9-1 Amu-Darya River Relative to the Project**

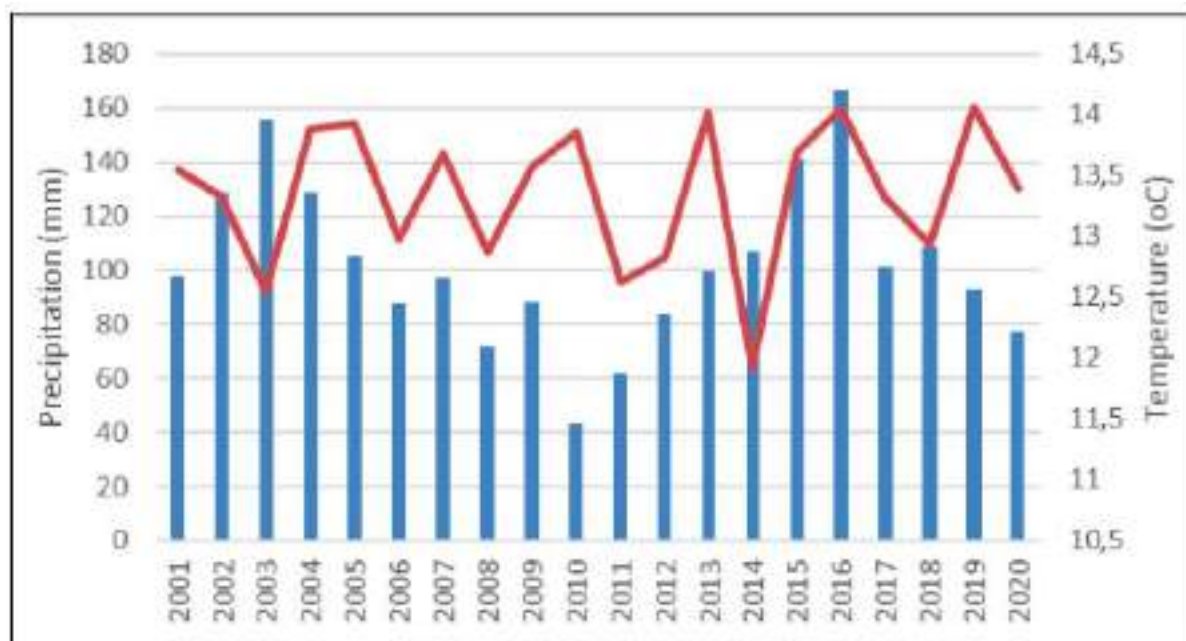
No permanent surface water bodies or rivers are observed within 10 km of the site, however, seasonal stream beds are evident, these are typically inundated during the short rainy season, which lasts from June until the end of July. In the wider area, water supply is reliant on the Amu Darya River. Smaller villages along the north bank of the river are not connected to the mains supply system. It is reported that water for agricultural purposes is scarce due to increases in upstream water consumption (Juru Energy, 2021).

### 9.3 Hydrology Study

UzAssystem (2022) conducted a hydrological study and flood modelling for the Project.

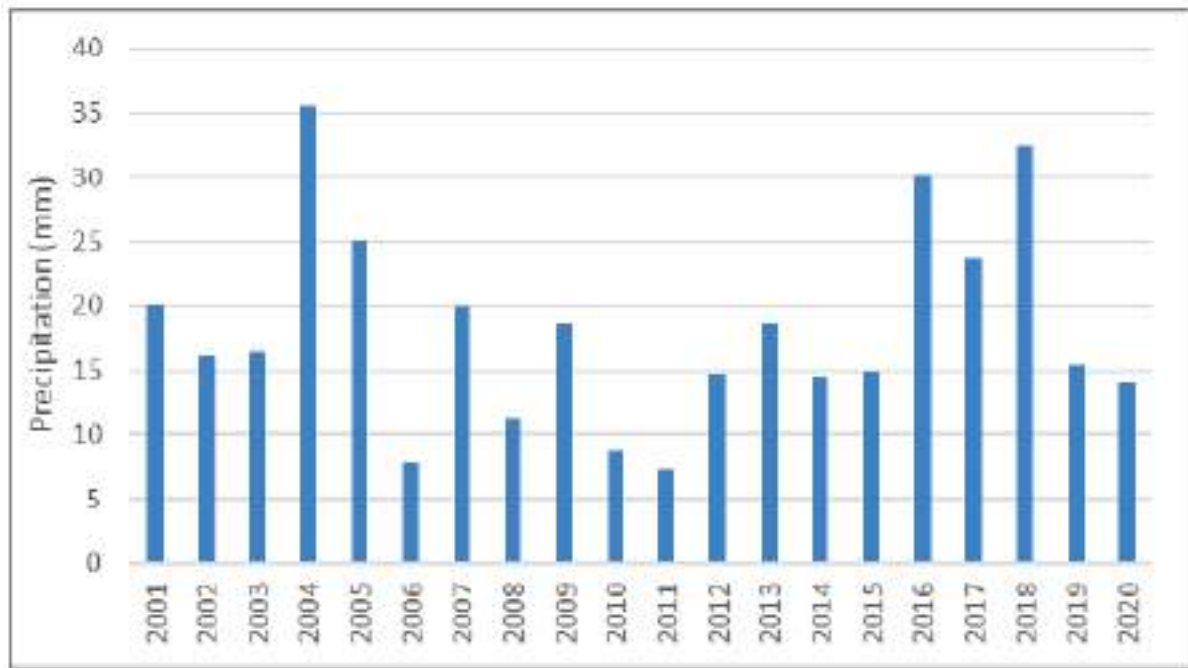
There is one representative meteorological station (i.e., Nukus M-II meteorological station) in relative proximity to the Project Site (approximately 82 km west, in Nukus city) but no stream gaging station is available in the basins of the site.

The mean annual temperature and annual total precipitation values are presented in the following figure.



**Figure 9-2 Annual Total Precipitation and Average Temperature from Nukus Meteorological Station**

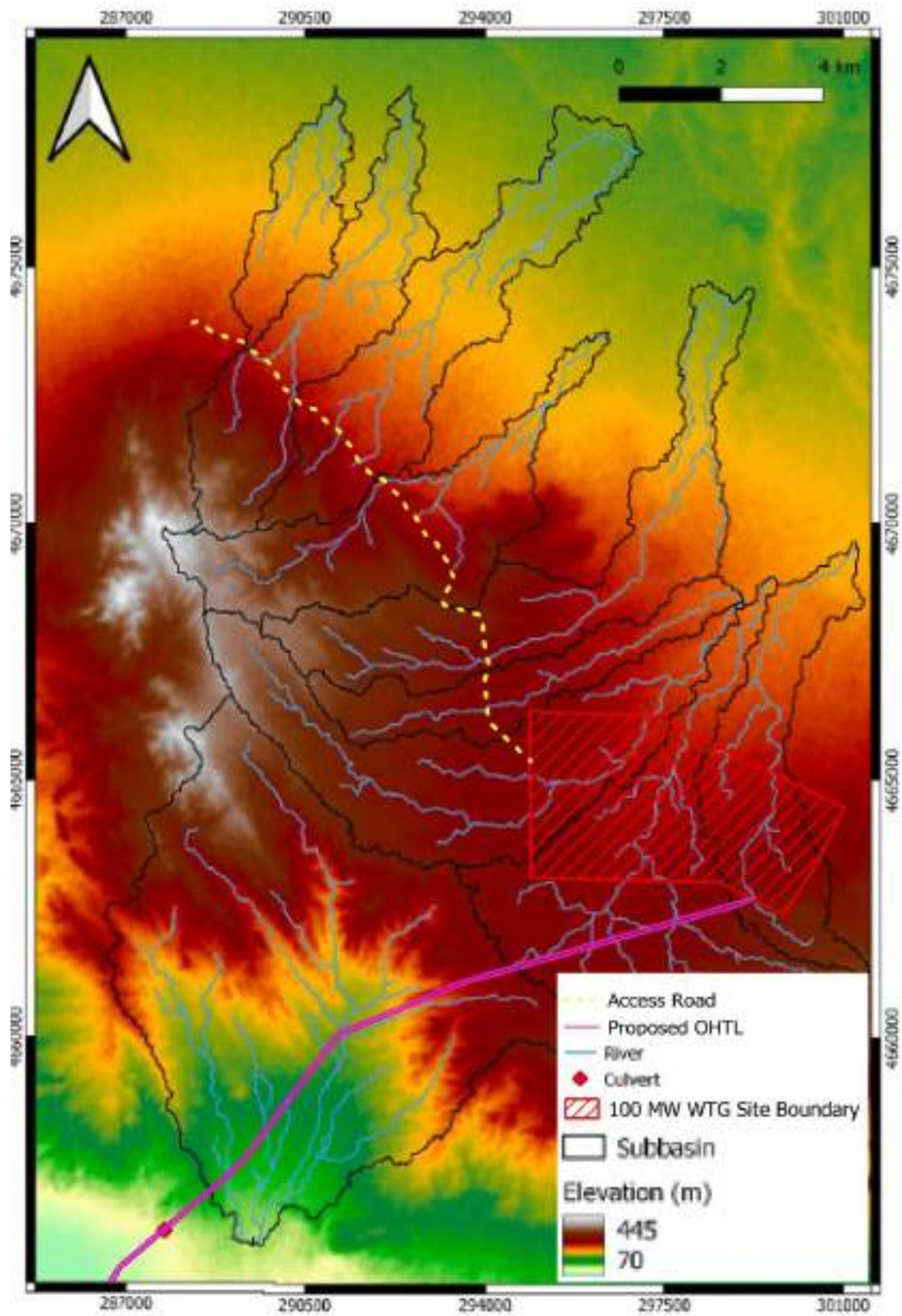
The daily maximum precipitation values are presented in the following figure.



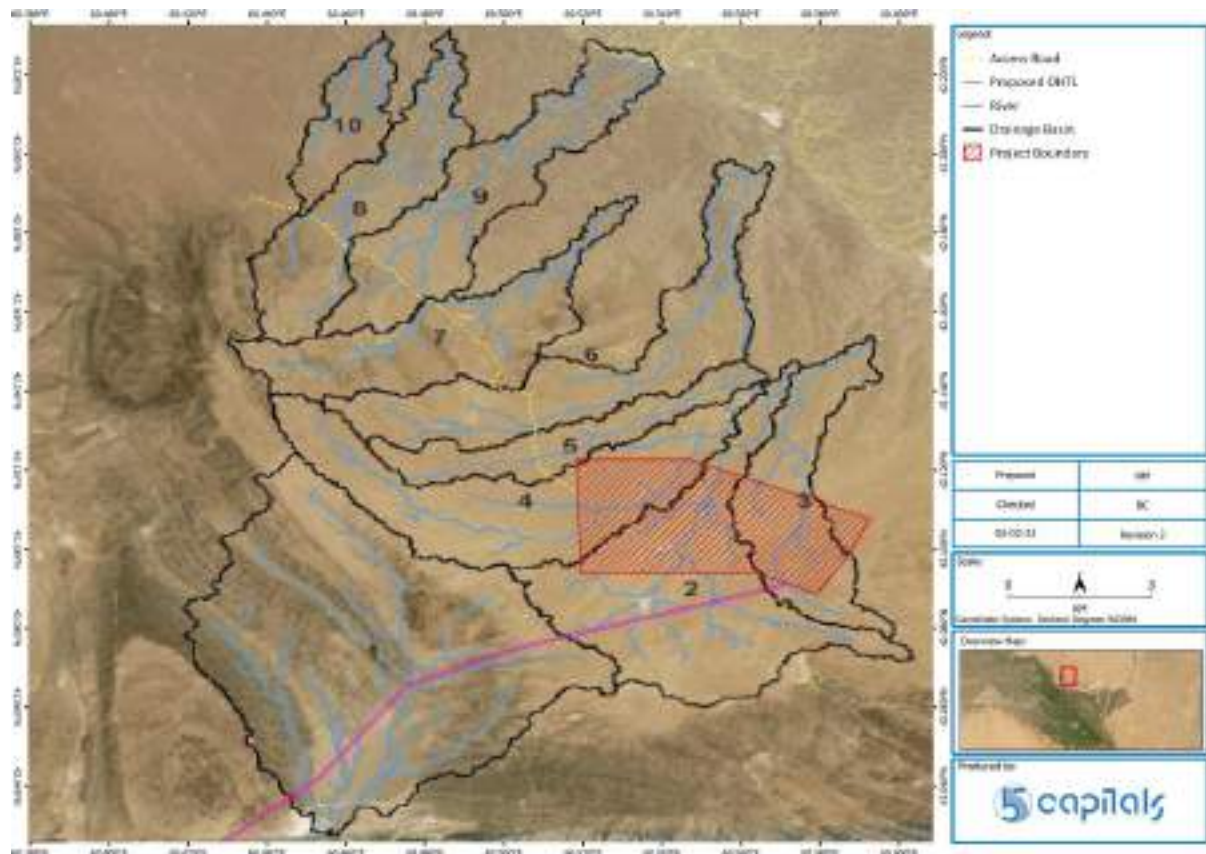
**Figure 9-3 Maximum Daily Precipitation from Nukus Meteorological Station**

Drainage lines and corresponding sub-basins were delineated by using the site-specific Digital Terrain Model (DTM) within the project site. According to the catchment analysis, a total of ten sub-basins are delineated, as shown in the following figures. The figures have been adapted from the hydrology study and the Project components (i.e., 100 MW WTG site boundary, access road and OHTL) have been overlain for reference.





**Figure 9-4 Sub-basins and River Network**



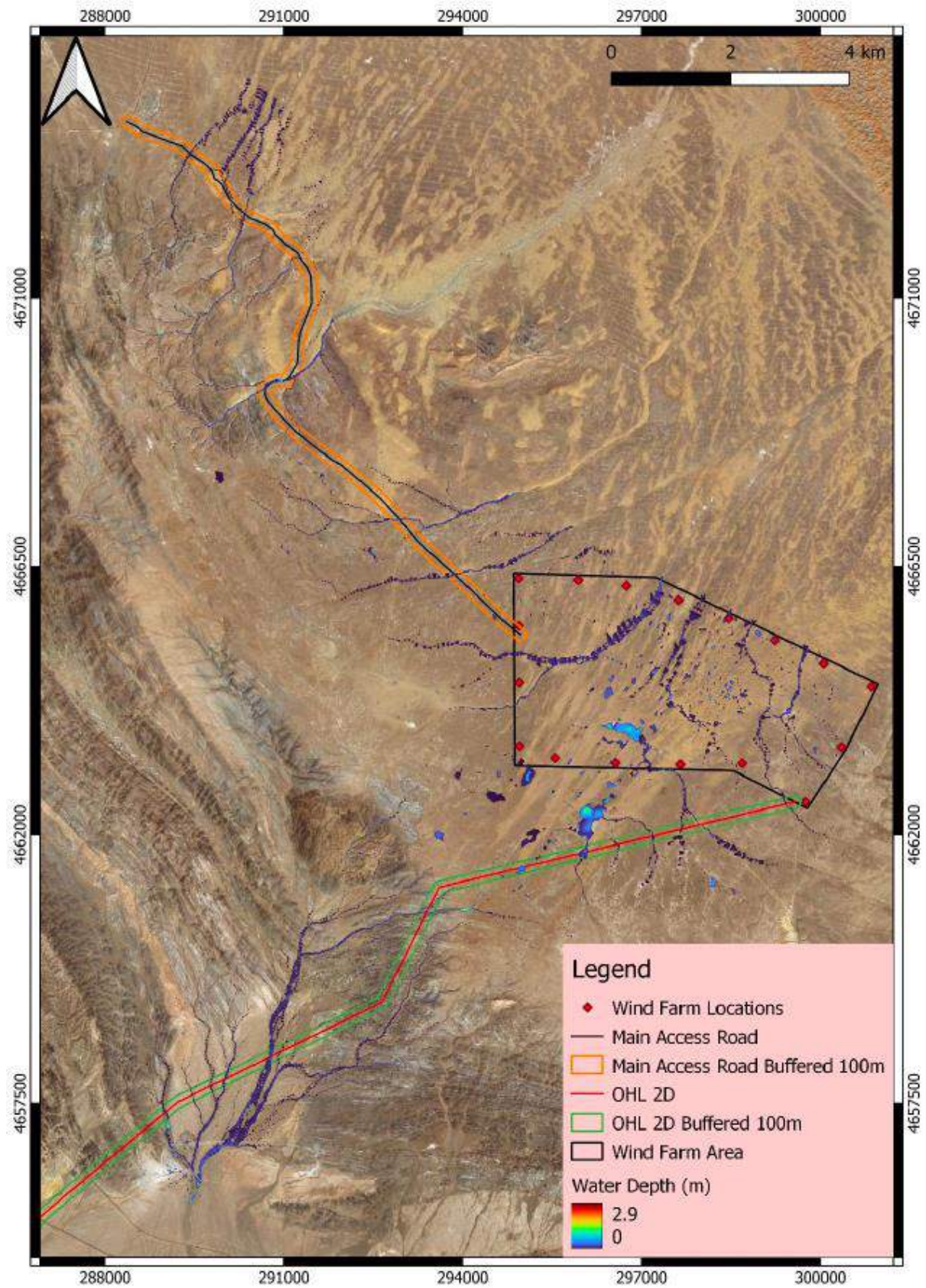
**Figure 9-5 Sub-basins**

Flood modelling was performed with HEC-RAS 2D software for 50-year and 100-year return rates.

The maximum water depth (i.e., water accumulation) maps for 100-year and 50-year storm are presented in the following figures. Note that the figures have overlain the previous access road, OHTL and WTG layout, nevertheless, are still considered relevant due to the minor changes.

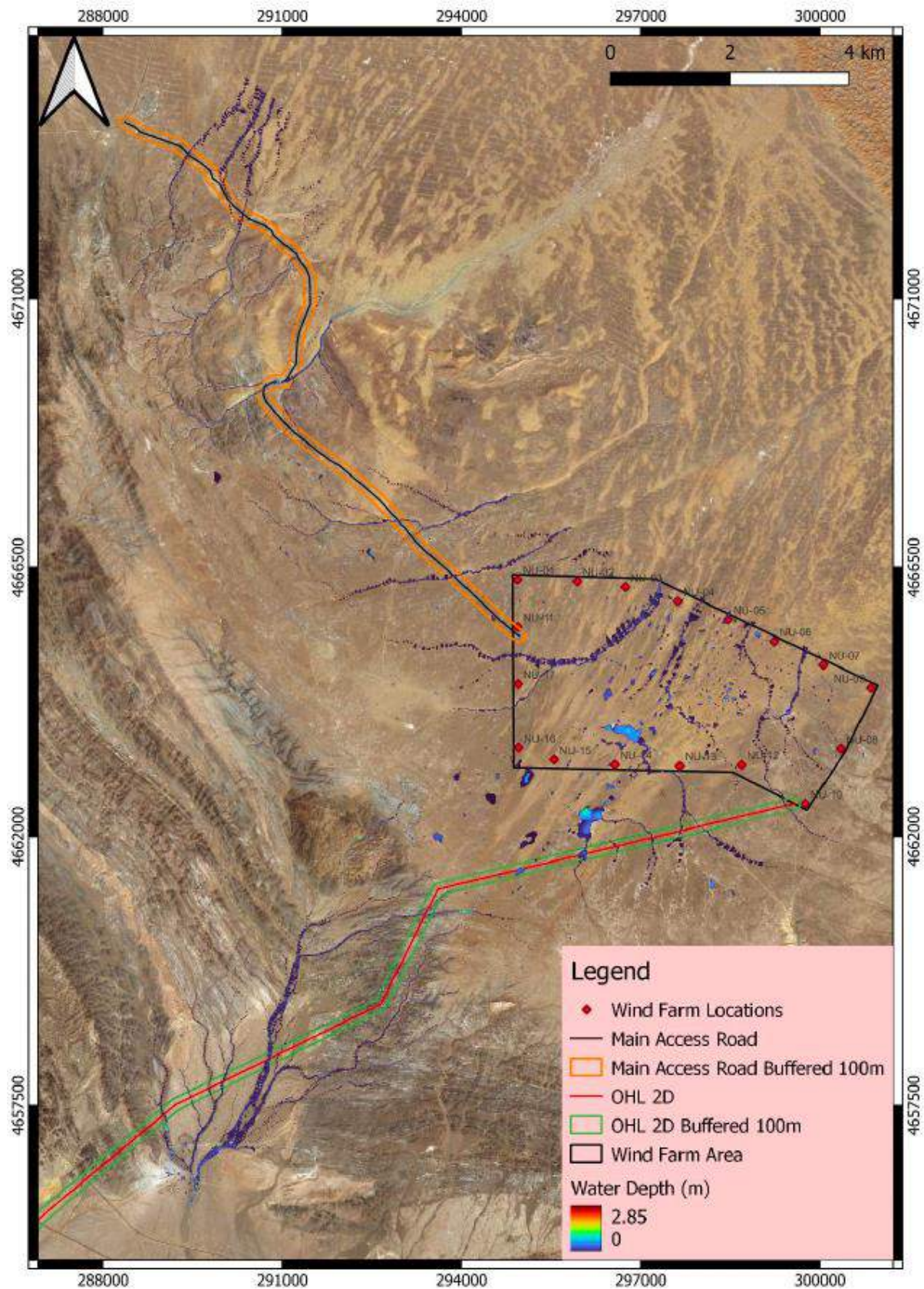
As is evident from the figures, there are numerous water crossings of the Project site (including the access road and OHTL), however, the majority of depths are <0.5 m.





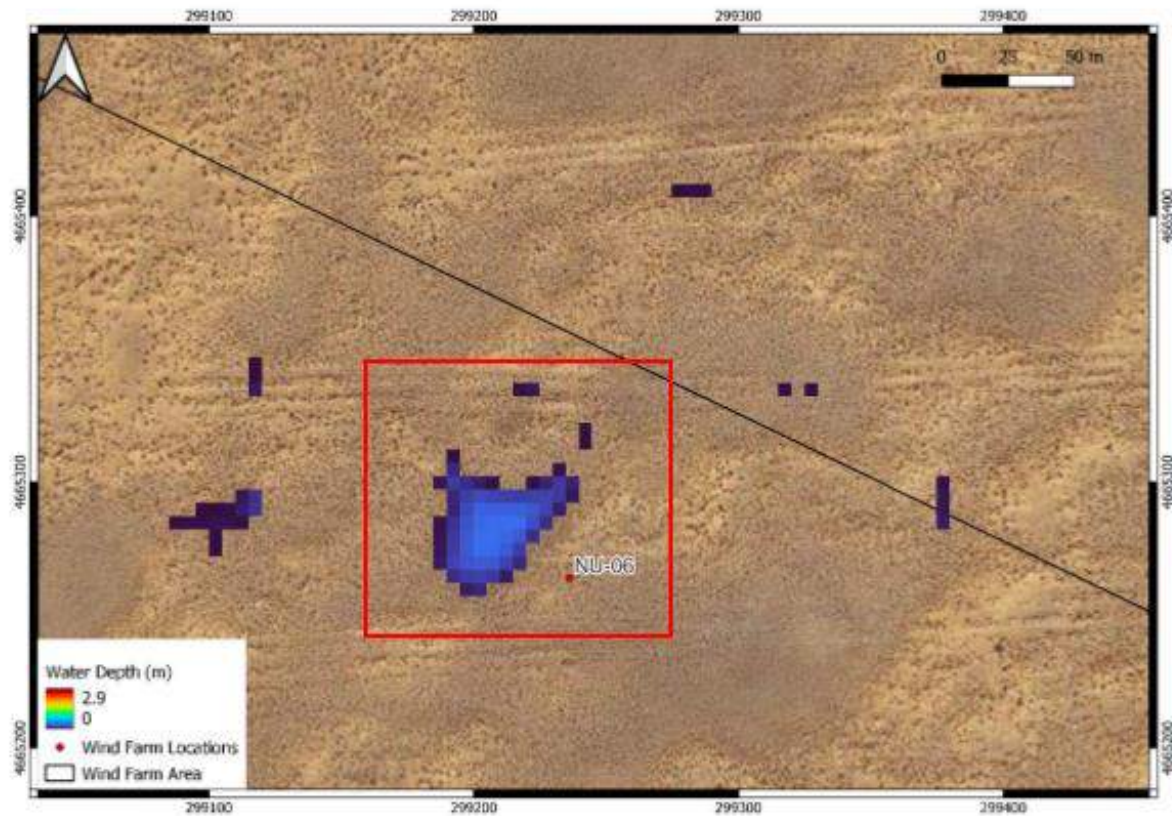
**Figure 9-6 Maximum Water Depth Map for 100-year Storm Event**





**Figure 9-7 Maximum Water Depth Map for 50-year Storm Event**

In order to define the flood risk conditions at the WTG locations, a buffer zone of 40 m was included with the flood risk maps. Only one WTG (NU-06) is located within a 'risky area' as can be seen in the following figure, the maximum water depth within the buffer is 27 cm. This was highlighted to the ACWA Power design team who stated that multiple options exist to mitigate flood risk at individual WTGs, and that this will be managed with EPC Contractor.



**Figure 9-8 WTG - Potential Risky Area - 1 in 100-year Storm**

In addition, potentially 'risky areas' have been identified along the OHTL and access road. Design mitigation such as culverts and other drainage measures will be required at these locations.



## 9.4 Potential Impacts, Mitigation, Management & Residual Impacts

### 9.4.1 Construction Phase

The construction phase will require the use of a limited amount of hazardous chemicals and therefore hazardous wastes will also be present in low quantities. Flood events during the construction phase can result in spills and leaks of these substances. Impacts to the environment as a result of this are covered in the Geology, Soil and Groundwater Chapter.

To mitigate this impact, the mitigation measures included within 'Table 8-9 Geology, Soil and Groundwater Impact Significance, Mitigation Measures and Residual Impacts' will be implemented. In addition, the EPC Contractor will not store hazardous materials in areas that have been highlighted as potentially risk in the flood risk modelling.

Significant changes in surface water drainage are not expected as a result of the construction of the Project due to the relatively limited areas for construction over the wider area.

Following implementation of the mitigation measures prescribed in the Geology, Soils and Groundwater Chapter and above, flood risk impacts during construction are considered negligible.

### 9.4.2 Operation Phase

Flood risk impacts during the operation phase are considered insignificant. There will be limited hazardous materials that will be stored within the O&M building and therefore potential leaks are not anticipated.

Following implementation of design mitigation as discussed previously (i.e., for WTG NU-6, the access road and OHTL), no significant operation flood risk impacts are expected.

GIIP mitigation measures such as the O&M team checking drainage infrastructure after flood events will be implemented.

## 9.5 Monitoring

No specific monitoring of flood risk impacts, besides the checking of drainage infrastructure as detailed previously, is proposed during either the construction or operation phase.



## 10 TERRESTRIAL ECOLOGY AND AVIFAUNA

### 10.1 Applicable Requirements & Standards

#### 10.1.1 National Regulations

- The Law of the Republic of Uzbekistan "On Nature Protection" (1992)
- The Law of the Republic of Uzbekistan "On Protection and Use of Vegetation" (1997),
- The Law of the Republic of Uzbekistan "On Protected Natural Reserves" (2004)
- The Law of the Republic of Uzbekistan "On Protection and Use of the Wildlife" (1997)
- Decree of the Cabinet of Ministers "Regulation on the procedure for using plant world objects and passing licensing procedures in the field of using plant world objects" No. 290 of 10.10.2014
  - Sets out the requirements to obtain permission to cut wood and shrub plantations that are in the zone of the construction site.

#### 10.1.2 Lender Requirements

##### **EBRD**

EBRD PR6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources establishes general requirements for the conservation of biodiversity and sustainable management of living natural resources covering aspects such as the assessment of issues and impacts on biodiversity.

Where applicable, the Project will intend to follow the targets set out by the EU Biodiversity Strategy including the Habitats Directive 92/43/EEC, the Birds Directive 2009/147/EC and the EU Regulation 1143/2014 on Invasive Alien Species. It is noted however that the targets are unlikely to be triggered by the Project due to the nature and scale of the Project and the existing ecological conditions within the Project site (primarily modified habitat due to farming).

##### **EPFIs**

The assessment of impacts upon terrestrial ecology is required with due consideration to IFC Performance Standard 6 on Biodiversity Conservation and Sustainable Natural Resource Management, which establishes requirements for protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources. When avoidance of impacts is not possible, measures to minimise impacts and restore biodiversity and ecosystem services should be implemented. Specifically, it is necessary to determine

baseline conditions and categorise the projects habitats as 'critical', 'modified' or 'natural' to undertake the necessary assessment. The Performance Standard defines the different habitats as follows:

- Natural Habitat: "Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition";
- Critical Habitat: "Critical habitats are areas with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes"; and
- Modified Habitat: "Modified habitats are areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition. Modified habitats may include areas managed for agriculture, forest plantations, reclaimed coastal zones, and reclaimed wetlands".

## 10.2 Baseline Conditions

The following subsections summarise the key information from ecological survey reports. Refer to Volume 4 for the reports in full.

### 10.2.1 Terrestrial Ecology

#### 10.2.1.1 Habitats and Flora

The spring botany survey was conducted at the end of April 2022 and the summer survey was conducted at the end of June 2022. The surveys identified five distinct habitat groups, as follows:

1. Weakly inclined, gentle hilly northern slope of relic low mountains with sedge-saltwort-sagebrush vegetation on sabulous-loamy grey-brown desert soil. This habitat type is represented within the area allocated for the WTGs, along the access road and along the upper part of the OHTL.
2. Fixed shallow, wavy and hilly sands with sedge-*Ferula*-saltwort-winterfat-sagebrush vegetation, sometimes with *Calligonum* and solitary black saxaul. This habitat type is represented within the area allocated for the WTGs.
3. Steep, dry, stony, southern slope of relic low mountains with rugged terrain and sparse petrophytic vegetation – xerophytic shrubs (*Atraphaxis spinosa*), sagebrush (*Artemisia turanica*), black saltwort (*Oreosalsola arbusculiformis*), and annuals. This habitat type occurs along the middle part of the OHTL.
4. Weakly inclined piedmonts with sagebrush-saltwort and saltwort vegetation on loamy and skeleton, sometimes gypsaceous grey-brown desert soil, dissected with gravelly dry beds of temporary streams. This habitat type is represented in the lower part of the OHTL.
5. Transformed (anthropogenic) habitat with sparse communities of wild rue, camel thorn and annuals. This habitat type is represented in the lower part of the OHTL, in the surroundings of the cement factory, railway and the A380 highway.

The habitats are shown on the following figure.

According to IUCN Habitats Classification Scheme, ver. 3.1 (2022), all these habitats belong to the type 8 (Desert), subtype 8.2 (Desert – Temperate). According to the IUCN Global Ecosystem Typology ver. 2.0 (2020), the habitats of the Project area belong to T5 Deserts and semi-deserts biome and T5.4 Cool deserts and semi-deserts ecosystem functional group of terrestrial realms.

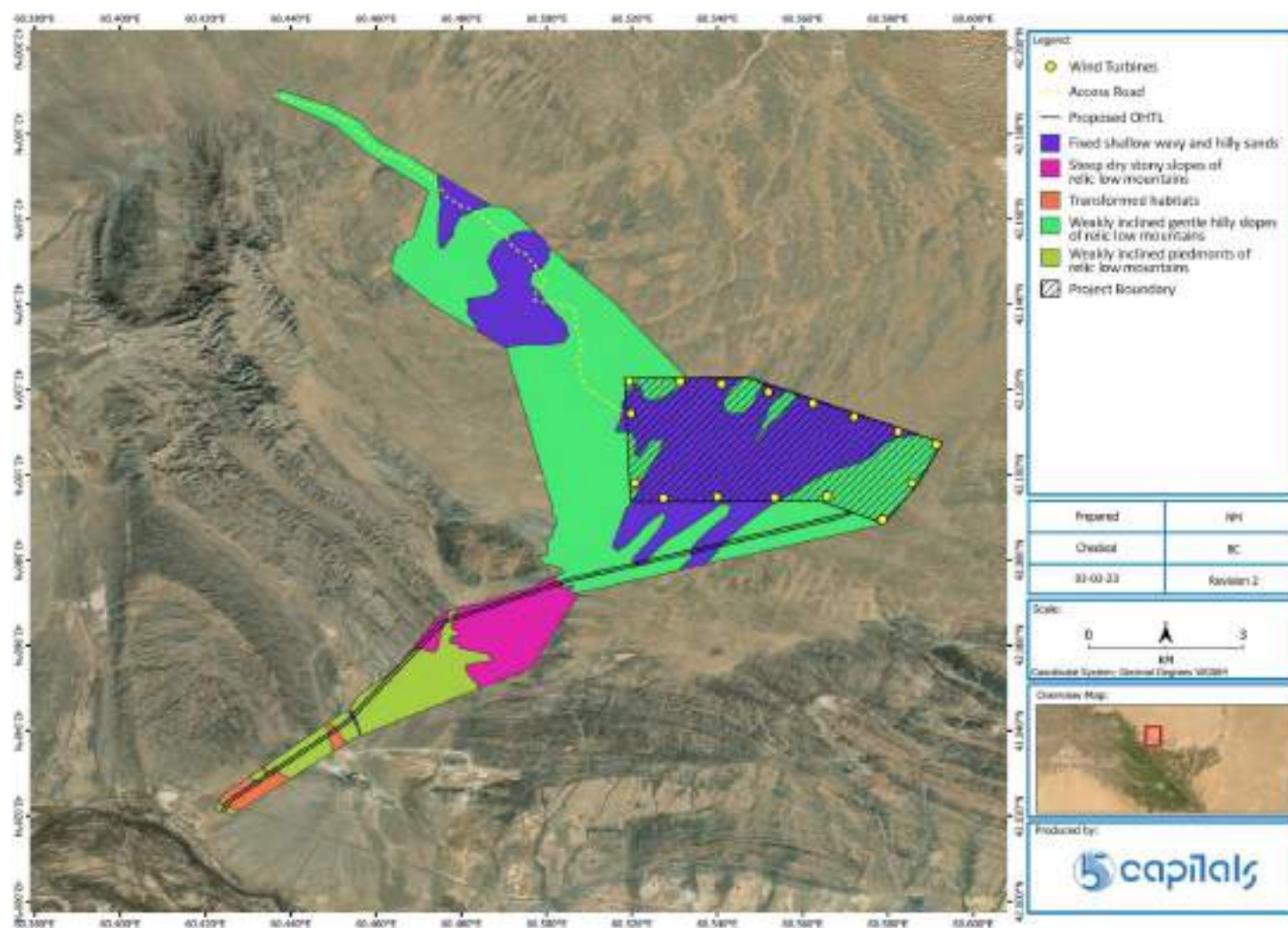


Figure 10-1 Habitat Map

Examples of the habitat communities are shown in the following figure.



Sedge-saltwort-sagebrush community (*Artemisia diffusa*, *A. turanica*, *Caroxylon orientale* (*Salsola orientalis*), *Carex physodes*) with solitary black saxaul on sandy desert soil (WTG NU-01, 42.121962 N 60.51933 E).



Sedge-Ferula-saltwort-winterfat-sagebrush community (*Artemisia diffusa*, *Krascheninnikovia ceratoides*, *Xylosalsola arbuscula*, *Caroxylon orientale*, *Ferula foetida*, *Carex physodes*) on fixed wavy shallow sands (WTG NU-07, 42.110178 N 60.582378 E).



Steep, dry, stony, southern slope with sparse xerophytic shrubs (*Atraphaxis spinosa*), sagebrush (*Artemisia turanica*), black saltwort (*Oreosalsola arbusculiformis*) and ephemers (middle section of OHTL, between 42.070571° N 60.505003° E and 42.051806° N 60.479849° E)



Transformed habitat in surroundings of the road A380 highway and cement factory, the lower part of the OHTL (42.025627° N 60.429289° E)

## Figure 10-2 Examples of Habitat Communities

### 10.2.1.2 Flora

The Project area is covered mainly with dwarf shrub and semi-shrub vegetation, dominated by sagebrush (*Artemisia diffusa*, *A. turanica*), saltworts (*Oreosalsola arbusculiformis*, *Salsola arbusculiformis*), *Caroxylon orientale* (*Salsola orientalis*), *Xylosalsola arbuscula* (*Salsola arbuscula*), winterfat (*Krascheninnikovia ceratoides*), desert sedge (*Carex physodes*), on some plots with *Ferula foetida*, *Calligonum leucocladum* or with black saxaul (*Haloxylon ammodendron*). The canopy cover is 20 – 40% on gentle northern slope and 10 – 20% (sometimes less than 10%) on steep and stony southern slope.



These native plant communities with sparse canopy cover and rather low species diversity are typical for insular low mountains of Kyzylkum including the Sultan Uvays range (Zakirov, 1971, Vegetation cover of Uzbekistan, 1971–1984).

In total, 95 plant species of 26 families were recorded within the Project area, none of them are globally threatened, and one species is red-listed at the national level (i.e., is recorded in the Uzbekistan Red Data Book (Uz RDB).

During the spring survey, two small populations (8 and 11 generative specimens) of nationally endemic *Lepidium subcordatum* (Brassicaceae) assessed as a rare, endangered species (Category 2) in the Uz RDB (2019) were identified on the northern slope of Sultan Uvays close to the alignment of the OHTL, the following figure depicts the location relative to the OHTL (the OHTL is shown as the blue lines).



**Figure 10-3 *Lepidium subcordatum* near OHTL. (A) is the location of the 8 specimens, (B) is the location of the 11 specimens.**

In June, this plant had already finished its growing season and its aerial part has dried up and been dispersed by wind. During the summer survey, only two and three specimens of *Lepidium subcordatum* were recorded in the same two localities, respectively.

According to published and herbarium data, 21 localities of *Lepidium subcordatum* are known to date, one of them is situated on the Ustyurt Plateau and 20 on the relic mountains of the Kyzylkum. The following figure depicts the known locations and geographical range of *Lepidium subcordatum*.





**Figure 10-4 Known locations and geographical range of *Lepidium subcordatum***

The analysis performed in accordance with the IFC PS6 and EBRD PR6 showed that *Lepidium subcordatum* does not trigger Critical habitat Criterion 2 (habitat of significant importance to endemic and/or restricted-range species) because the Project area contains less than 10% of its global habitat and population (About 2000 plants were recorded in the Navoi Province and about 700 in the Bukhara Province (Shomurodov et al., 2018; Tojibaev et al., 2019, 2020)). As per the Uz RDB the main conservation concern for the species is as a result of overgrazing.

No nationally or globally red-listed, or local endemic plants were found within the wind farm site boundary or along the access road.

Most of species recorded for the Project area are typical for desert zone of Central Asia and common and widespread.

### 10.2.1.3 Mammals

Surveying for non-volant mammals was undertaken by surveys (comprising both car driven and walked transects) in Winter 2021 and Spring 2022, and by deploying camera traps from Winter 2021 to Summer 2022. The surveys also included consultations with locals.

The following figure depicts the winter and spring mammal survey effort.



**Figure 10-5 Winter and Spring Mammal Survey Effort**

Eight camera traps were installed in December 2021, located in different biotopes, The memory cards were checked in February 2022, in May, and 2 additional cameras were installed and 2 relocated before all were removed in June 2022. Cameras were installed in a total of 12 locations, as shown in the following figure (note there is no JEP12).

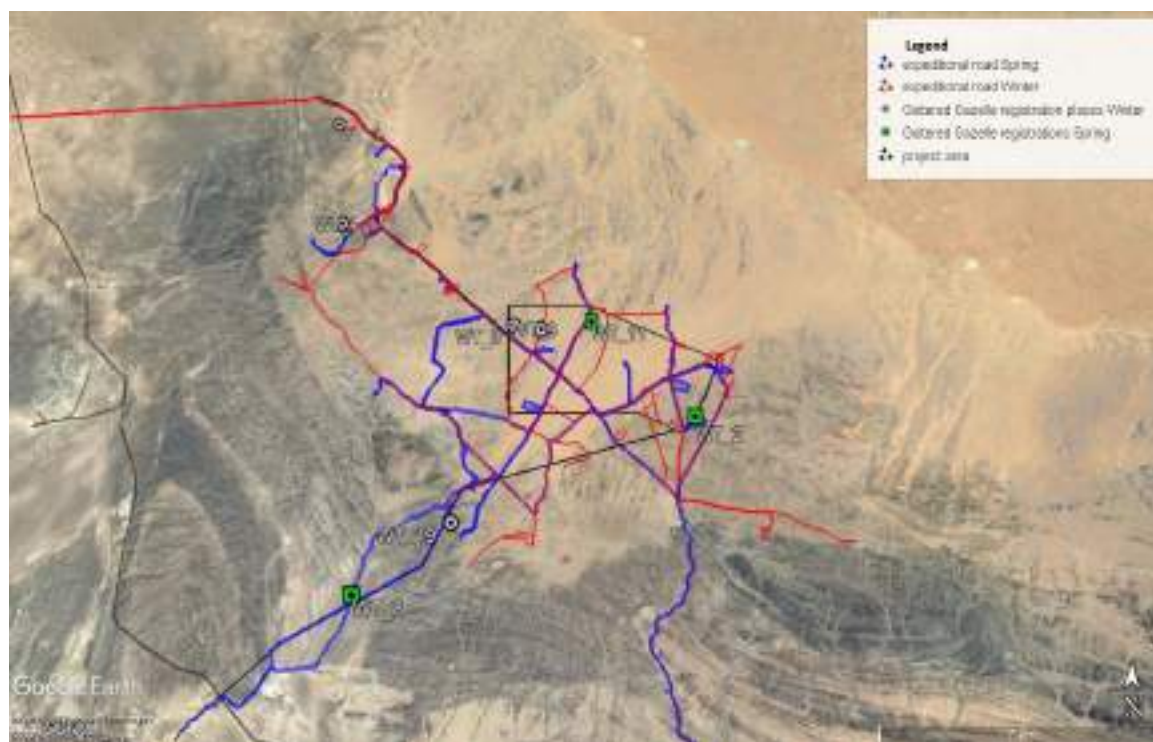


**Figure 10-6 Camera Trap Locations**

A total of 14 species were recorded during the winter and spring mammal surveys, three of which are recorded in the Uz RDB: the Corsac Fox (*Vulpes corsac*), Caracal (*Caracal caracal*) and Goitered Gazelle (*Gazella subgutturosa*). The Goitered Gazelle is also listed as a Vulnerable species on the IUCN Red List and under Appendix II of the Convention of Migratory Species (CMS).

#### GOITERED GAZELLE

Excrement and tracks of the Goitered Gazelle were observed during both the winter and spring surveys. The following figure depicts the locations of registrations, note that the previous access road and OHTL alignment are shown. The estimated number of individuals is between 10 – 35, depending on the season. The maximum number was noted in winter. During the spring, the gazelles migrate deep into the desert to avoid the presence of shepherds and livestock.



**Figure 10-7 Goitered Gazelle Registrations**

Despite the presence of traces and excrement across the Project area, the Goitered Gazelle was only recorded by one camera trap 'JEP01', at the northern section of the access road. The following figure depicts the Goitered Gazelles observed by the camera trap.





Female Goitered Gazelle



Young Male Goitered Gazelle

### Figure 10-8 Goitered Gazelle Camera Trap Images

#### CORSAC FOX

Excrement of the Corsac Fox was found in winter in the north-east of the area allocated for the WTGs, as shown in the following figure (note that the previous access road and OHTL alignment are shown). The small number of Corsacs is likely due to the abundance of the Red Fox, who is a food competitor and a dominant species over the Corsac, including in terms of size.

The presence of Corsac Fox in the Project area was not confirmed by camera traps.



Figure 10-9 Location of Corsac Fox Excrement

## CARACAL

Traces/tracks of caracal were observed to the west of the area allocated for the WTGs, as shown in the following figure, note the previous access road and OHTL alignment are shown. This location was assumed to be used by a caracal as an area to rest. As it is typical for caracals to dig a small hole in which they rest.

A camera trap was installed near this location, in order to capture images of the species should it use the place regularly. The presence of the Caracal in the Project area was not confirmed by the camera traps.



**Figure 10-10 Presumed Caracal Registration Point**

## BUKHARA RED DEER

The Bukhara Red Deer (*Cervus hanglu bactrianus*), listed as Endangered in the UzRDB, was not recorded during either winter or spring survey, nor was it recorded by any of the camera traps. During consultations with the Lower Amu Darya Biosphere Reserve, the rangers stated that although the Bukhara Red Deer tend to go out to feed on farms nearby the Reserve and the Sultan-Uwais mountain ranges in Spring, the Bukhara Red Deer does not interact with areas close to the Project.

The following table summarises the mammal species recorded. Further details of mammal sightings are provided in **Volume 4**.

**Table 10-1 Mammal Survey Results**

NAME OF SPECIES		IUCN / RDB STATUS	FURTHER CRITERIA	TOTAL NO. OBSERVED / DENSITY / NOTES
SPECIES	COMMON NAME			
<i>Hemiechinus auritus</i>	Long-eared Hedgehog	LC	-	0.12/km on walking transects and 0.02/km during night counts
<i>Lepus totai</i>	Tolai Hare	LC	Criteria VI: Ecological Function	0.25/km on walking transects and 0.47/km during night counts
<i>Spermophilus fulvus</i>	Yellow ground squirrel	LC	Criteria VI: Ecological Function	1.004/km
<i>Allactaga elater</i>	Small five-toed Jerboa	LC	-	0.04/km
<i>Dipus sagitta</i>	Hairy-footed Jerboa	LC	-	0.06/km
<i>Eremodipus lichtensteini</i>	Lichtenstein's Jerboa	LC	-	0.06/km
<i>Ellobius tancrei</i>	Zaisan Mole Vole	LC	Criteria VI Ecological Function	0.2 colonies/100 ha
<i>Meriones meridianus</i>	Midday Gerbil	LC	-	0.04/km
<i>Rhombomys opimus</i>	Great Gerbil	LC	Criteria VI: Ecological Function	1.1 colony/100 ha
<i>Vulpes corsac</i>	Corsac Fox	2(VU:D) (RDB)	PBF; Nationally listed	Excrement of the Corsac Fox were found in winter in the north-east of the area allocated for the WTGs. The presence of Corsac Fox in the Project area was not confirmed by camera traps.
<i>Vulpes vulpes</i>	Red Fox	LC	Criteria VI: Ecological Function	0.25/km on walking transect and 1.028 indiv/1km.
<i>Felis silvestris ornate</i>	Asiatic wild Cat	LC	Criteria VI: Ecological Function	0.022/km
<i>Caracal caracal</i>	Caracal	CR (RDB)	PBF; Nationally listed	Traces/tracks of caracal were observed to the west of the area allocated for the WTGs. A camera trap was installed near this location, in order to capture images of the species should it use the place regularly. The presence of the Caracal in the Project area



NAME OF SPECIES		IUCN / RDB STATUS	FURTHER CRITERIA	TOTAL NO. OBSERVED / DENSITY / NOTES
SPECIES	COMMON NAME			
				was not confirmed by the camera traps.
<i>Gazella subgutturosa</i>	Goitered Gazelle	VU / VU:D /CMS II	PBF; IUCN, RDB & Bern Convention  EDGE Species Rank: 432	The estimated number is about 10 – 35 individuals depending on the season. During the spring the gazelles migrate deep into the desert to avoid the presence of shepherds and livestock.

### 10.2.1.4 Reptiles

The spring reptile survey was conducted between April 16 – April 19, 2022, more than 12 km of transects were completed, as shown in the following figure.



**Figure 10-11 Spring Reptile Survey Effort**

In general, the composition of the herpetofauna of the Project site is standard for desert areas. The reptiles identified during the spring survey are shown in the following table, for a full list of reptiles that may reside in the Project area refer to the full report provided in **Volume 4**.

## 10-2 Reptile Spring Survey Results

NAME OF SPECIES		IUCN / RDB STATUS	FURTHER CRITERIA	ABUNDANCE
SPECIES	COMMON NAME			
<i>Testudo horsfieldii</i>	Russian Tortoise	VU	PBF	Common
<i>Trapelus sanguinolentus</i>	Steppe agama	-	-	Common
<i>Teratoscincus scincus</i>	Common Wonder Gecko	-	-	Common
<i>Eremias lineolata</i>	Striped racerunner	-	-	Common
<i>Eremias intermedia</i>	Aralo-Caspian racerunner	-	-	Common
<i>Psammophis lineolatus</i>	Sand racer	-	-	Common
<i>Phrynocephalus interscapularis</i>	Lichtenstein's Toadhead Agama	-	-	Numerous

The summer reptile survey was conducted between June 24 – June 27, 2022. Six locations were surveyed along the proposed OHTL, six points along the proposed access road and 14 points across the area allocated for the development of the WTGs. More than 37.5 km of transects were surveyed, the survey effort is shown in the following figure.



**Figure 10-12 Summer Reptile Survey Effort**

During the summer survey, ten species of reptiles were recorded in the study area, of which only one species, the Desert Sand Boa, is listed in the Uz RDB, with hunting/capturing for its use in alternative medicine the reason for its inclusion. The Desert Sand Boa was noted to be relatively numerous in the Project area. No species included on the IUCN Red List were identified. The following table outlines the reptiles identified during the summer survey.

**Table 10-3 Reptile Summer Survey Results**

NAME OF SPECIES		IUCN / RDB STATUS
SPECIES	COMMON NAME	
Access Road		
Trapelus sanguinolentus	Steppe agama	-
Teratoscincus scincus	Common Wonder Gecko	-
Eremias intermedia	Aralo-Caspian racerunner	-
Phrynocephalus mystaceus	Secret Toadhead Agama	-
Phrynocephalus interscapularis	Lichtenstein's Toadhead Agama	-
Eryx miliaris	Desert Sand Boa	Uz RDB
Land Allocated for WTG		
Trapelus sanguinolentus	Steppe agama	-
Eremias lineolata	Striped Racerunner	-
Psammophis lineolatus	Sand Racer	-
Eremias intermedia	Aralo-Caspian racerunner	-

NAME OF SPECIES		IUCN / RDB STATUS
SPECIES	COMMON NAME	
<i>Teratoscincus scincus</i>	Common Wonder Gecko	-
<i>Crossobamon eversmanni</i>	Comb-toed Gecko	
<i>Phrynocephalus interscapularis</i>	Lichtenstein's Toadhead Agama	-
<i>Phrynocephalus mystaceus</i>	Secret Toadhead Agama	
<i>Eryx miliaris</i>	Desert Sand Boa	Uz RDB
<b>OHTL</b>		
<i>Trapelus sanguinolentus</i>	Steppe agama	-
<i>Eremias intermedia</i>	Aralo-Caspian racerunner	-
<i>Teratoscincus scincus</i>	Common Wonder Gecko	-
<i>Crossobamon eversmanni</i>	Comb-toed Gecko	
<i>Phrynocephalus mystaceus</i>	Secret Toadhead Agama	
<i>Phrynocephalus interscapularis</i>	Lichtenstein's Toadhead Agama	-
<i>Eryx miliaris</i>	Desert Sand Boa	Uz RDB
<i>Tenuidactylus caspius</i>	Caspian Thin-toed Gecko	

The Uzbekistan toad-headed agama (IUCN - EN) was not recorded despite numerous attempts, optimal weather conditions (during the summer survey) and a seemingly suitable biotope for this species. In addition, the Caspian Monitor was not identified in the Project area, however, interviews with locals indicated that this species likely lives in the wider region.

## 10.2.2 Birds and Bats

### 10.2.2.1 Birds

The 100 MW Project site was comprehensively surveyed following the guidance of the Scottish Natural Heritage (SNH) guidelines and aligned with GIIP and the requirements of the Development Finance Institutions (DFI) for onshore wind farm bird surveys. The survey data was then included in a Collision Risk Model (CRM). Both the survey and CRM were provided as part of the tender documentation. The CRM is further discussed in the operational impact assessment for birds.

#### VANTAGE POINT SURVEYS

##### Coverage and Timing/Dates – Vantage Point Surveys

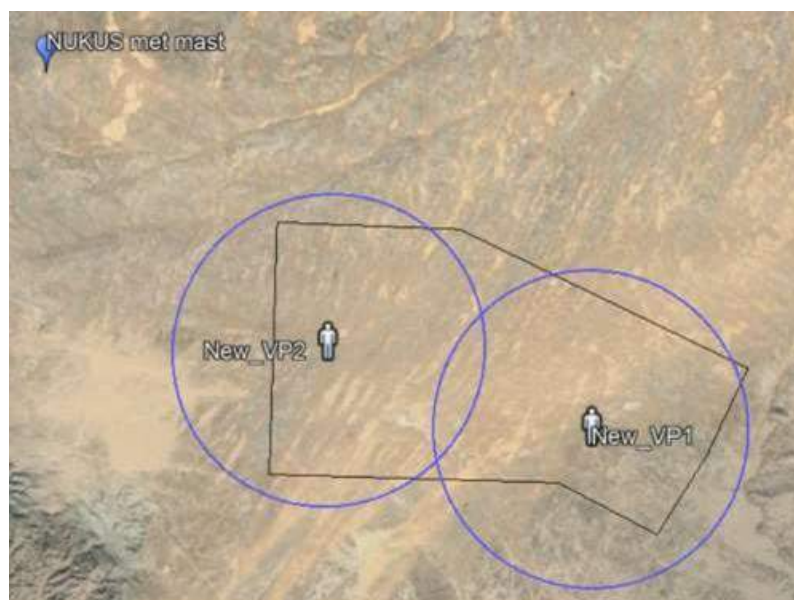
Vantage Point (VP) surveying was undertaken for one year over four seasons from April 2020 – March 2021. In order to compensate for the gap in the surveys of Spring 2020, additional survey hours were undertaken from March 2021 – April 2021.

The VP surveys of the wind farm site were carried out during the following seasons:

- Spring: April 25 – May 15, 2020; March 16 – April 25, 2021 – 80.35 total VP survey hours
- Summer: May 16 – August 31, 2020 – 107.6 total VP survey hours
- Autumn: September 1 – November 15, 2020 – 72 total VP survey hours
- Winter: November 16, 2020 – March 15, 2021 – 75 total VP survey hours

#### Survey Protocol and Effort – VP Surveys

Two VPs were surveyed which collectively covered at least 95% of the site boundary for the WTGs, plus an extension up to approximately 1 km outside of the wind turbine area on all sides. The VP locations are shown in the following figure. The VPs were surveyed for three hours during each effort with at least 36 survey hours undertaken at each survey point during each season. A total of 324 survey hours were undertaken over the course of one year.



**Figure 10-13 Location of Vantage Points**

The species for which CRM was conducted included all “target” and “secondary” bird species that were observed at the site within the VP survey effort. Target species were defined to include all species with conservation concern or protected status on either the national or international “red lists”. Secondary species were defined to include all other raptors and vultures that could potentially occur at the site, as well as selected additional large-bodied birds that could become a significant risk concern for the Project, if seriously impacted. The list of such species was developed with input from regional bird experts and was intended to include all potentially high- or moderate- sensitivity bird species that could occur at the site.



This list was also updated on an ongoing basis, as needed, specifically with the inclusion of any target or secondary species that were observed at the site during the survey effort, that were not initially anticipated as likely to occur at the site. The species included within the CRM for the Project are discussed further in the operation impact assessment.

## HOUBARA BUSTARD SURVEYS

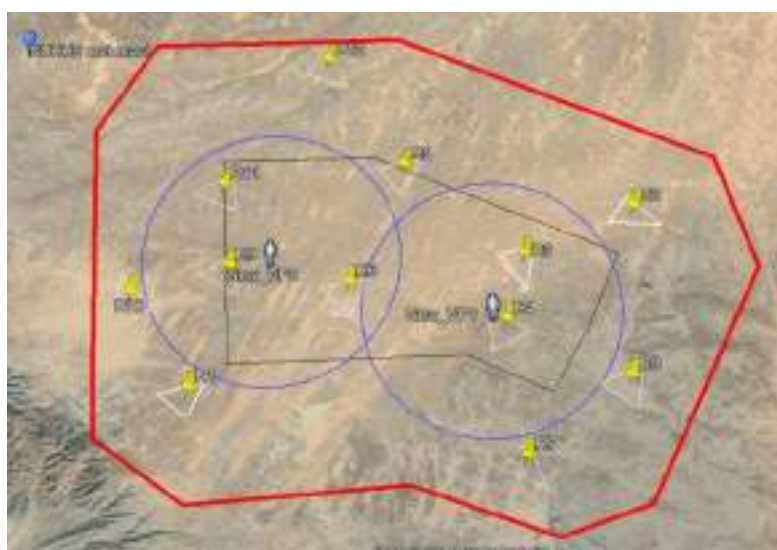
### Coverage and Timing/Dates – Houbara Surveys

Specialised Houbara surveys were carried out in the study area during the following seasons;

- 4 days in May 2020 covering 11.25 km of driven transects
- 18 days in June-August 2020 covering 6 – 11 km of driven transects
- 12 days in October – November 2020 covering 12 walked transects and 12 – 15 km driven transect
- 12 days of survey in December 2020 – February 2021 covering 12 walked transects and 12 – 15 km driven transect
- 6 days of survey at 18 points during peak breeding display season March 21 – April 24, 2021

### Survey Protocol and Effort – Houbara Surveys

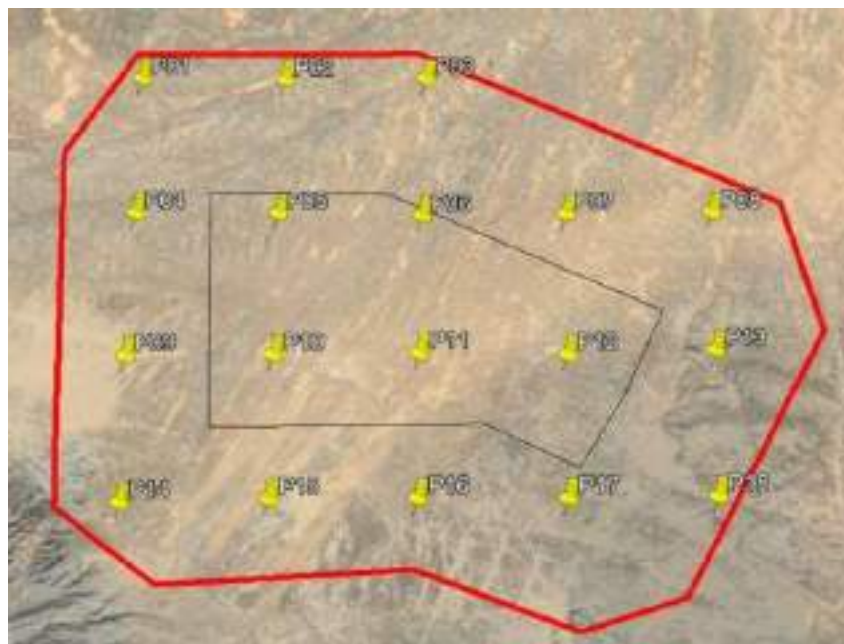
To obtain the population density of Houbara Bustard, triangular-transect surveys were conducted within the Project area, at 12 locations each 2 km in length. The transect surveys were conducted during each season from May 2020 – February 2021. The following figure shows the triangular transects within the site boundary of the WTGS (black polygon) and wider study area which includes a 2 km buffer zone (red polygon).



**Figure 10-14 Houbara Bustard transect survey locations**



In addition, specialised Houbara Bustard surveys were undertaken during the peak Houbara mating season, which is one of the only times that the Houbara Bustard can readily be viewed, due to the species' intensively secretive and shy nature. Additional surveys were conducted during the peak breeding display season from March 21 – April 24, 2021 at 18 points evenly distributed in the study area. Two 30-minute point counts were undertaken at each point during peak during peak display hours; 3 hours after sunrise and 2 hours before sunset. The following figure provides the locations of the 18 additional Houbara survey points.



**Figure 10-15 Houbara Bustard Specialised Survey Locations**

#### **RAPTOR NEST SEARCHES**

Specialised nest-searching surveys were undertaken, particularly in the known breeding seasons, with the aim to identify any raptor breeding behaviour taking place. Special attention was given to the cliffs and rocky outcrops surrounding the project area, as these may be used as nest sites for key species including the Golden Eagle and Egyptian Vulture.

#### Coverage and Timing/Dates

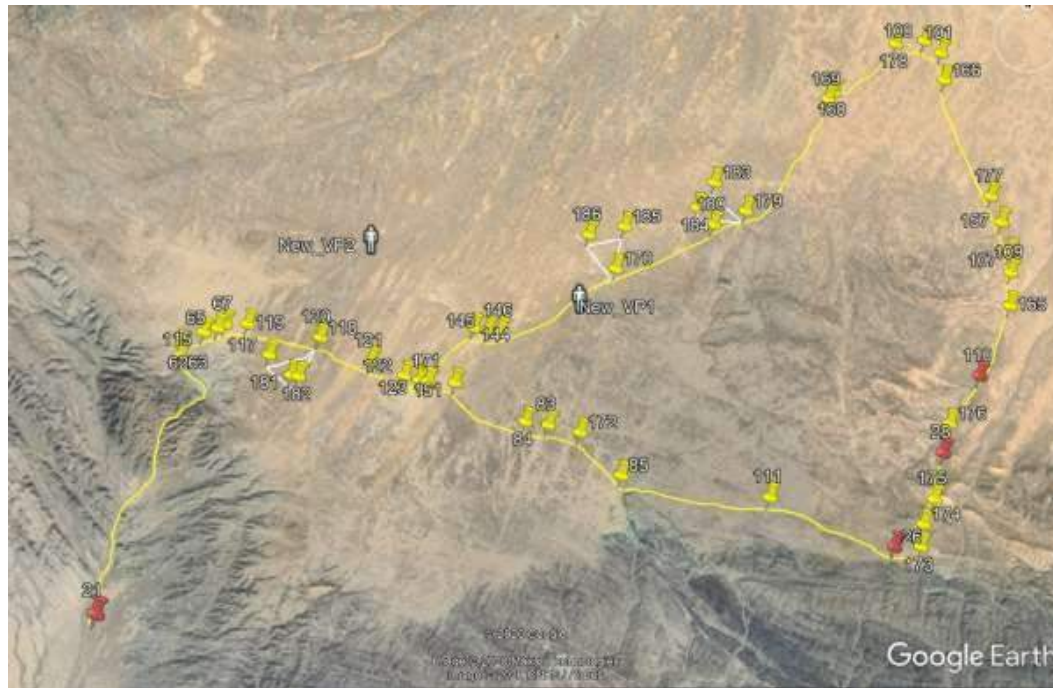
Raptor nesting surveys were conducted during the following seasons;

- 4 days in May 2020 covering 2 transects covering mountains within 10 km of turbine area
- 18 days in June – August 2020 covering 2 transects covering the mountains within 10 km of turbine area
- 7 days in March – April 2021 covering 4 transects collectively covering wind turbine area plus 5 km buffer

### Survey Protocol and Effort

Common methods and recommendations of Novikov (1953) were used in the study of raptor bird nests. The study area encompassed the site boundary of the WTGs and a buffer zone of 5 km. The study was conducted along 4 fixed transects of 12-15 km each.

The following figures depict the transects taken during the nest searching survey.



**Figure 10-16 Transect 1 of the Raptor Nest Searching Survey**



**Figure 10-17 Transect 2 of the Raptor Nest Searching Survey**



**Figure 10-18 Transect 3 of the Raptor Nest Searching Survey**



**Figure 10-19 Transect 4 of the raptor nests searching survey**

#### OHTL SURVEY

The baseline survey of the OHTL route is currently being conducted throughout four seasons at three VPs. Each VP will be surveyed following SNH guidelines over 2 hours on a monthly basis for 12 months. The cliffs surrounding the OHTL route will be surveyed for nesting raptors.

#### Coverage and Timing/Dates – OHTL

The following seasonal surveys were conducted for the OHTL alignment:

- Winter 2021 VP survey
- Spring 2022 VP survey
- Summer 2022 VP survey
- Autumn 2022 VP survey
- Raptor Nest Searching surveys – Breeding Season



## Survey Protocol and Effort

The following figure provides the locations of the VPs along the original OHTL alignment.



**Figure 10-20 VP Survey Locations for the OHTL alignment**

A consultation letter was received on 24/03/2022 from the SCEEP who stated that they recommend. a VP is located close to the Lower Amu Darya Biosphere Reserve. Subsequently, the VPs were shared with the SCEEP and the Committee confirmed that the VPs are located in acceptable locations.

Following the change in alignment of the OHTL, VP2 was shifted for the upcoming Autumn survey, the following figure depicts the location of the updated VP2.



**Figure 10-21 Updated Vantage Point Along OHTL**

#### VP AND NEST SEARCH SURVEY RESULTS

The following table summarises the bird species recorded throughout all four seasons of VP surveys as well as nest searching surveys. For target and secondary species, only observations occurring within the species-specific maximum reliable observation radius were included within the CRM and are listed in this table, with the exception of one observation of an Imperial Eagle at > 1km distance, included here as a notable incidental observation.

**Table 10-4 Species Recorded During VP and Nest Searching**

SCIENTIFIC NAME	COMMON NAME	UZBEK STATUS	GLOBAL STATUS	RAPTOR NESTING SURVEY	VANTAGE POINT SURVEYS				TOTAL
					SPRING	SUMMER	AUTUMN	WINTER	
<i>Alectoris chukar</i>	Chukar				10	6	24	19	59
<i>Columba livia</i>	Rock Pigeon				3		25	191	219
<i>Streptopelia turtur</i>	European Turtle-Dove	VU	VU				38		38
<i>Pterocles orientalis</i>	Black-bellied Sandgrouse				24	12	204	45	285
<i>Caprimulgus aegyptius</i>	Egyptian Nightjar					2			2
<i>Grus grus</i>	Common Crane						2850		2850



SCIENTIFIC NAME	COMMON NAME	UZBEK STATUS	GLOBAL STATUS	RAPTOR NESTING SURVEY	VANTAGE POINT SURVEYS				TOTAL
					SPRING	SUMMER	AUTUMN	WINTER	
<i>Neophron percnopterus</i>	Egyptian Vulture	VU	EN	1					1
<i>Aquila nipalensis</i>	Steppe Eagle	VU	EN	5	2		2	1	10
<i>Aquila heliaca</i>	Imperial Eagle	VU	VU	1				1	2
<i>Aquila chrysaetos</i>	Golden Eagle	VU		11	1	1	2	2	17
<i>Circus aeruginosus</i>	Eurasian Marsh-Harrier			6	2	17		1	6
<i>Circus cyaneus</i>	Hen Harrier				2		4	1	7
<i>Buteo lagopus</i>	Rough-legged Hawk						12	4	17
<i>Buteo buteo</i>	Common Buzzard						13		13
<i>Buteo rufinus</i>	Long-legged Buzzard			1			60	4	65
<i>Athene noctua</i>	Little Owl				17	30	29	15	91
<i>Upupa epops</i>	Eurasian Hoopoe				13	1			14
<i>Merops persicus</i>	Blue-cheeked Bee-eater				64	209			273
<i>Falco tinnunculus</i>	Eurasian Kestrel			10	24	16	42	14	106
<i>Falco vespertinus</i>	Red-footed Falcon		NT	1	1				2
<i>Lanius phoenicuroides</i>	Red-tailed Shrike						3		3
<i>Lanius excubitor</i>	Great Gray Shrike				18		36	9	63
<i>Pica pica</i>	Eurasian Magpie				2				2
<i>Podoces panderi</i>	Turkestan Ground-Jay						2		2
<i>Corvus frugilegus</i>	Rook				200			2	202
<i>Corvus corone</i>	Carion Crow					8	4	50	62
<i>Corvus cornix</i>	Hooded Crow				18		10	121	149
<i>Eremophila alpestris</i>	Horned Lark							317	317
<i>Calandrella brachydactyla</i>	Greater Short-toed Lark				389	323	548		1260
<i>Melanocorypha yeltoniensis</i>	Black Lark							5	5
<i>Alaudala rufescens</i>	Lesser Short-toed Lark				567	386	610	266	1829
<i>Alauda arvensis</i>	Eurasian Skylark						2		2
<i>Galerida cristata</i>	Crested Lark				79	63	48	155	345
<i>Hippolais languida</i>	Upcher's Warbler				2	20			22

SCIENTIFIC NAME	COMMON NAME	UZBEK STATUS	GLOBAL STATUS	RAPTOR NESTING SURVEY	VANTAGE POINT SURVEYS				TOTAL
					SPRING	SUMMER	AUTUMN	WINTER	
<i>Hirundo rustica</i>	Barn Swallow				54	35			89
<i>Phylloscopus trochilus</i>	Willow Warbler						26		26
<i>Phylloscopus collybita</i>	Common Chiffchaff						120		120
<i>Phylloscopus trochiloides</i>	Greenish Warbler						101		101
<i>Sylvia nana</i>	Asian Desert Warbler				10	4	176		190
<i>Sylvia curruca</i>	Lesser Whitethroat						67		67
<i>Sylvia communis</i>	Greater Whitethroat						128		128
<i>Sturnis vulgaris</i>	European Starling							1600	1600
<i>Phoenicurus phoenicurus</i>	Common Redstart				2				2
<i>Saxicola maurus</i>	Siberian Stonechat				8		17		25
<i>Oenanthe oenanthe</i>	Northern Wheatear				14		46		60
<i>Oenanthe isabellina</i>	Isabelline Wheatear				582	431	552		1565
<i>Oenanthe deserti</i>	Desert Wheatear				27		163		190
<i>Oenanthe pleschanka</i>	Pied Wheatear				3	2			5
<i>Passer ammodendri</i>	Saxaul Sparrow						2		2
<i>Passer domesticus</i>	House Sparrow				128	390			518
<i>Passer hispaniolensis</i>	Spanish Sparrow					2			2
<i>Passer montanus</i>	Eurasian Tree Sparrow						35		35
<i>Motacilla alba</i>	White Wagtail				33		75	28	136
<i>Anthus campestris</i>	Tawny Pipit				3				3
<i>Fringilla coelebs</i>	Common Chaffinch							105	105
<i>Fringilla montifringilla</i>	Brambling							57	57
<i>Rhodospiza obsoleta</i>	Desert Finch							44	44
<i>Spinus spinus</i>	Eurasian Siskin							20	20
<i>Emberiza bruniceps</i>	Red-headed Bunting				8				8

## SURVEY RESULTS – OHTL

The following table summarises the target and secondary bird species recorded during the OHTL survey to date. Target species for the survey were identified during baseline survey conducted on the project site in April 2020 – April 2021. As a result of the observations, species of high concern were categorised as 'target species' or 'secondary species'. Refer to Volume 4 for the list of target and secondary species and the other species identified during the OHTL surveys.

**Table 10-5 OHTL Bird Survey Results**

SPECIES	COMMON NAME	IUCN	UzRDB	RANGE (ENDEMIC/REGIONAL/ TRANSCONTINENTAL)	VP 1	VP 2	VP 3	TOTAL
<b>Winter</b>								
<i>Aquila nipalensis</i>	Steppe Eagle	EN	2 (VU:D)	Transcontinental	0	0	1	1
<i>Haliaeetus albicilla</i>	White-tailed Sea-eagle	LC	2 (VU:R)	Transcontinental	1	0	0	1
<i>Circus cyaneus</i>	Northern Hen Harrier	LC	-	Transcontinental	0	1	0	1
<i>Buteo rufinus</i>	Long-legged Buzzard	LC	-	Transcontinental	0	0	2	2
<i>Falco tinnunculus</i>	Common Kestrel	LC	-	Regional	0	0	1	1
<b>Spring</b>								
<i>Aquila nipalensis</i>	Steppe Eagle	EN	2 (VU:D)	Transcontinental	0	0	3	3
<i>Aquila chrysaetos</i>	Golden Eagle	LC	2 (VU:R)	Regional	1	4	1	6
<i>Buteo rufinus</i>	Long-legged Buzzard	LC	-	Transcontinental	1	1	5	7
<i>Falco tinnunculus</i>	Common Kestrel	LC	-	Regional	0	0	3	3
<i>Grus grus</i>	Common Crane	LC	-	Transcontinental	80	140	180	400
<b>Summer</b>								
<i>Falco cherrug</i>	Saker Falcon	EN	1 (EN)	Regional	0	1	0	1
<i>Aquila chrysaetos</i>	Golden Eagle	LC	2 (VU:R)	Regional	0	2	2	4

SPECIES	COMMON NAME	IUCN	UZRDB	RANGE (ENDEMIC/REGIONAL/ TRANSCONTINENTAL)	VP 1	VP 2	VP 3	TOTAL
<i>Circus cyaneus</i>	Northern Hen Harrier	LC	-	Transcontinental	0	0	2	2
<i>Buteo rufinus</i>	Long-legged Buzzard	LC	-	Transcontinental	2	2	5	9
<i>Falco tinnunculus</i>	Common Kestrel	LC	-	Regional	0	0	2	2
<b>Autumn</b>								
<i>Circus cyaneus</i>	Hen (Northern) Harrier	LC	-	Transcontinental	-	-	2	2
<i>Buteo rufinus</i>	Long-legged Buzzard	LC	-	Transcontinental	-	1	5	6
<i>Buteo buteo</i>	Common Buzzard	LC	-	Transcontinental	1	-	-	1
<i>Falco tinnunculus</i>	Common Kestrel	LC	-	Regional	-	-	1	1
<i>Grus grus</i>	Common Crane	LC	-	Transcontinental	90	80	120	290

#### SURVEY RESULTS – HOUBARA SURVEYS

No Houbara Bustards were observed during any of the surveys at the Project site. Neither was this species observed incidentally during any of the surveys performed at the Project Site.

Given the level of overall bird survey effort conducted at the site from April, 2020 through April, 2021, including a year-round specialised survey effort, and an intensive survey following a specific protocol recommended by leading national experts, conducted during its peak courtship season when displaying males are most conspicuous and readily observed, the Project baseline survey provides a reasonably strong indication that the site boundary of the WTGs component of the Project does not have a high risk of impacting this protected species.

However, it is important to note that during bird baseline surveys conducted at the previous candidate site, close to the meteorological mast, three observations of Houbara Bustard were documented during the autumn (2019) season. This indicates that the species could be present at the Project as well, at least on an occasional, low-density basis, particularly in light of the fact that the Houbara Bustard is a notoriously cryptic species that can easily elude detection, particularly on surveys conducted outside of its courtship season in early spring.

#### SURVEY RESULTS – RAPTOR NEST SEARCH

No raptor nests were discovered, nor were any observations of behaviours indicative of possible breeding activity collected during the survey effort.

#### 10.2.2.2 Bats

Field survey efforts include the deployment of passive acoustic bat monitors at ground level, roost searches and transect surveys during the warm months between May and October 2022. The bat surveys are restricted to this time period due to the decreased bat activity expected within the region during the winter season.

The bat survey protocols have been developed based on the methodology provided by Bat Conservation Trust (BCT) survey guidelines (Collins 2012 and 2016), Eurobat Guidance (Guidelines for Consideration of Bats in Wind Farm Projects. Revision 2014) and Scottish Natural Heritage (SNH) guidelines (Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation. Version: January 2019),

As per SNH guidelines, passive acoustic monitoring at height should be considered if:

- Other supporting evidence (e.g. from previous surveys of the site or other local sources) suggests a high level of bat activity within the height of the rotor-swept area,
- Existing infrastructure allows and is representative of the proposed changes (e.g. where a site extension is proposed and automated detectors may be fixed to the nacelles of existing turbines if they are of similar size to the new turbines),
- A meteorological mast is present or will be erected.

Since none of the above circumstances apply to the Project, passive acoustic monitoring is being conducted at ground level. Four Wildlife Acoustics Song Meter SM4 static bat detectors have been and are being deployed for two nights per month from April to October 2022 to record bat activity through the bat active season. Data obtained has been and will be analysed using Kaleidoscope Pro Auto Analysis with "preloaded" parameters of ultrasonic calls from "European" bats found in Uzbekistan for the primary processing of audio recordings. Following this, the BatSound 4 program was used to measure the call parameters and check the identification of bat calls made by the Kaleidoscope Pro Auto Analysis program. Bat calls parameters known for European bat populations (Barataud, 2015) and bat species from neighboring countries for Uzbekistan (Benda et al., 2012) were used.

In addition, transect surveys using active acoustic monitors are being and will be undertaken to identify the potential ecological functions of habitats within the Project area vital for the maintenance of bat population.

The locations of the bat detectors and transects are shown in the following figure.



**Figure 10-22 Locations of Bat Static Detectors (SD) and Transects**

The following table provides a list of species identified during the bat surveys undertaken to date, alongside their respective level of conservation status and their collision risk (as per Rodrigues et al., 2015).

**Table 10-6 Identified Bat Species in the Project Area**

SPECIES	IUCN RED LIST	RED BOOK OF THE REPUBLIC OF UZBEKISTAN (2019)	LEVEL OF COLLISION RISK
Bottas Serotine <i>Eptesicus bottae</i>	LC	Absent	Medium
Serotine Bat <i>Eptesicus serotinus</i>	LC	Absent	Medium
Common Pipistrelle <i>Pipistrellus pipistrellus</i>	LC	Absent	High

Calls of 2 – 3 species of bats have been recorded in the Project area: *Eptesicus* sp. (*Eptesicus bottae* and *Eptesicus serotinus*) and *Pipistrellus pipistrellus*.

All bat species identified are classified as LC by IUCN and are not included in the Uz RDB. The UZ RDB 2019 includes four bat species: *Rhinolophus hipposideros* (VU), *Tadarida teniotis* (VU), *Otonycteris hemprichi* (VU) and *Myotis burcharensis* (CR), none of which were identified. According to IUCN, the Turkestan Pipistrelle (DD) may be present, however, this species was also not identified during the survey effort.



The two medium-flying species of the genus *Eptesicus* and *P. pipistrellus* have the medium risk of collisions (Roemer et al., 2017; Wellig et al., 2018).

In both the passive and transect surveys, the average bat activity fluctuated between May and September, with the peak activity recorded in mid-summer (July) before reducing significantly in October prior to hibernation.

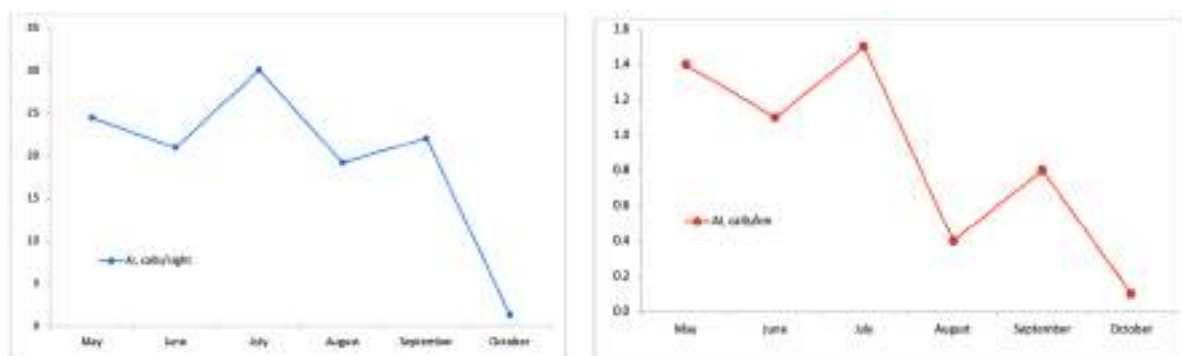
During the passive survey *Eptesicus* sp. accounted for 64% of the total recorded calls over the study period while *P. pipistrellus* accounted for the remaining 36%. For the active transects, the percentage of calls was roughly equal between *Eptesicus* sp. and *P. pipistrellus*, however, *P. pipistrellus* calls were not recorded on seven of the 12 transects. The average calls per transect over the total survey effort was 0.54 per km.

The static detector monitoring results are shown in the following table.

**Table 10-7 Bat Static Detector Results**

MONTH	CALLS / NIGHT
May	24.5
June	21.0
July	30.1
August	19.2
September	22.1
October	1.4
<b>Total</b>	<b>20.6</b>

The following figure depicts average bat activity per month from the passive detectors (left) and from the transects (right), showing a clear decrease by October.



**Figure 10-23 Bat Activity Results**

#### BAT ROOSTS

Bat roost surveys were carried out between June 16 – 19, 2022. In total, 184 km were covered by survey transects and 57 roost locations were examined.

Three species of bats were discovered – Botta's serotine (*Eptesicus ognevi*), Serotine Bat (*Eptesicus serotinus*), and the Common pipistrelle bat (*Pipistrellus pipistrellus*). All of the bats are listed as LC by IUCN and are not included in the Uz RDB.

The following figure depicts the survey effort and the location of natural and anthropogenic bat roosts, note that the previous OHTL and access road alignment is shown. Anthropogenic roosts mainly relate to stormwater drainage tunnels, such as those under the railway. 54 stormwater drainage tunnels were checked, and bats were found in 48 of them.

It is important to note that no bat roosts were discovered in the proximity of the area allocated for the WTGs, with the majority of roosts identified located >10 km from the nearest WTG, in areas of anthropogenic structures such as stormwater drains.

Places suitable for wintering bats were not found.



**Figure 10-24 Bat Roost Survey Effort and Roost Locations**

### 10.2.3 Invasive Species

No invasive species were identified during any of the surveys. Further consultations were conducted with national experts with regards to potential presence of invasive species in the surrounding areas and it is understood that invasive species are considered to be rare in the desert areas in which the Project is located. Although considered to be unlikely, impacts arising from invasive species are assessed in Section 10.5.1.4.

#### 10.2.4 Ecosystem Services

Ecosystems provide services that result in beneficial human impacts. A decline or loss of any of these services and their benefits can result in socio-economic impacts that extend beyond environmental damages (World Resources Institute, 2013).

Ecosystems services are divided into four categories (World Resources Institute, 2013 and also consistent with the four types outlined in IFC PS6):

- "Provisioning services are the goods or products obtained from ecosystems, such as food, timber, fiber, and freshwater.
- Regulating services are the contributions to human well-being arising from an ecosystem's control of natural processes, such as climate regulation, disease control, erosion prevention, water flow regulation, and protection from natural hazards.
- Cultural services are the nonmaterial contributions of ecosystems to human well-being, such as recreation, spiritual values, and aesthetic enjoyment.
- Supporting services are the natural processes, such as nutrient cycling and primary production, that maintain the other services."

IFC PS6 outlines that ecosystem services valued by humans are often underpinned by biodiversity, and hence impacts to biodiversity can adversely affect the delivery of ecosystem services.

IFC PS6 also states that *"Priority ecosystem services are two-fold: (i) those services on which project operations are most likely to have an impact and, therefore, which result in adverse impacts to Affected Communities; and/or (ii) those services on which the project is directly dependent for its operations (e.g., water).*

The provisioning ecosystem service of livestock herding is considered to be applicable to the Project, however, as discussed in Section 16 the Project is not expected to negatively impact upon this activity.

Therefore, no priority ecosystem services are applicable to the Project.

### 10.3 Critical Habitat Assessment

#### 10.3.1 Overview

'Critical Habitat' is a concept applicable to several international financial lending institutions, designed to enable the identification of areas of high biodiversity value in which development would be particularly sensitive and require special attention. The concept has been developed in consultation with numerous international conservation organisations and thus

considers many pre-existing conservation approaches, such as Key Biodiversity Areas (KBA), Important Bird Areas (IBA), and Alliance for Zero Extinction Sites (AZE).

A Critical Habitat Assessment is one of the four principal steps of the biodiversity baseline study that is required to understand biodiversity and ecosystem services in the area that may be affected by a project. This is an assessment of the context in which the development is proposed and therefore does not consider specific impacts at this stage of analysis. It answers the basic question, "How important is the study area for conservation and what PR6 requirements will apply?".

The initial step is a high-level CHA Screening exercise, which identifies all possible biodiversity elements that could trigger criticality, that are relevant for the project area. Based on the findings of the screening exercise, if deemed to be required, a Critical Habitat Assessment is then undertaken utilizing a three-stage approach:

**Stage 1 – Desktop Assessment and Stakeholder Engagement:** Following the definition of the study area, initial desktop reviews and stakeholder consultation of the local community and qualified specialists through interviews and letters is conducted to understand the possible biodiversity features and use of natural resources within the project landscape from the perspective of all relevant stakeholders.

**Stage 2 – Field Surveys and Data Collection:** At this stage surveys are undertaken to confirm the seasonal and annual distribution of biodiversity features and ecological functions with the project area.

**Stage 3 – Assessment of Findings against Critical Habitat criteria:** Determination of critical habitat and priority biodiversity feature status against prescribed thresholds as per EBRD PR6 GN6 (v. January 1, 2020).

The findings of the CHA process are then fed into the overall ESIA and subsequent environmental management and monitoring.

### 10.3.2 Methodology

The CHA Screening is undertaken to identify all possible biodiversity elements that may trigger a Critical Habitat or Priority Biodiversity Feature designation as per the criteria set out by the relevant guidelines. The following guidelines have been referenced to ensure a full and complete screening:

- EBRD PR6 Biodiversity Conservation and Sustainable Management of Living Natural Resources

- EBRD Guidance Note 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (v. January 1, 2020). December 17, 2019
- IFC PS6 on Biodiversity Conservation and Sustainable Management of Living Resources.
- IFC Guidance Note 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (January 1, 2012, updated June 27, 2019)
- Global datasets and tools for screening critical habitats, legally protected areas and internationally recognised area: Information sheet for Equator Principles Financial Institutions

### 10.3.3 Qualifying Criteria

There are several international lending organisations that have produced varying criterion for which critical habitat is defined by; however, they are generally aligned with the IFC PS6 five criterion with some institutions adding additional criterion. The below provides an overview of all applicable criteria as per IFC and EBRD:

- IFC PS6 Criterion 1: Critically Endangered and Endangered Species /// EBRD criterion (ii) its importance to the survival of endangered or critically endangered species;
- IFC PS6 Criterion 2: Endemic and Restricted-range Species /// EBRD criterion (iii) its importance to endemic or geographically restricted species and sub-species;
- IFC PS6 Criterion 3: Migratory and Congregatory Species /// EBRD criterion (iv) its importance to migratory or congregatory species;
- IFC PS6 Criterion 4: Highly Threatened or Unique Ecosystems /// EBRD criterion (i) its high biodiversity value;
- IFC PS6 Criterion 5: Key Evolutionary Processes /// EBRD criterion (v) its role in supporting assemblages of species associated with key evolutionary processes;
- EBRD criterion (vi) its role in supporting biodiversity of significant social, economic or cultural importance to local communities; and
- EBRD criterion (vii) its importance to species that are vital to the ecosystem as a whole (keystone species).

Some sensitive ecological features of the study area that may be affected by the project may be considered “priority biodiversity features”. Priority biodiversity features (PBF) are defined by the EBRD as a sub-set of biodiversity that is particularly irreplaceable or vulnerable, but at a lower priority level than critical habitats. These features as identified as species or issue that do not merit critical status but remain a concern from a conservation perspective and require careful consideration during project assessment and impact mitigation.

EBRD have outlined the following criteria for the classification of a PBF:

- PBF Criterion (i): Threatened habitats
- PBF Criterion (ii): Vulnerable species
- PBF Criterion (iii): Significant biodiversity features identified by a broad set of stakeholders or governments (such as Key Biodiversity Areas or Important Bird Areas)
- PBF Criterion (iv): Ecological structure and functions needed to maintain the viability of priority biodiversity features

#### 10.3.4 Identifying Biodiversity Elements of Concern

The CHA screening was undertaken through a review of publicly available databases including but not limited to:

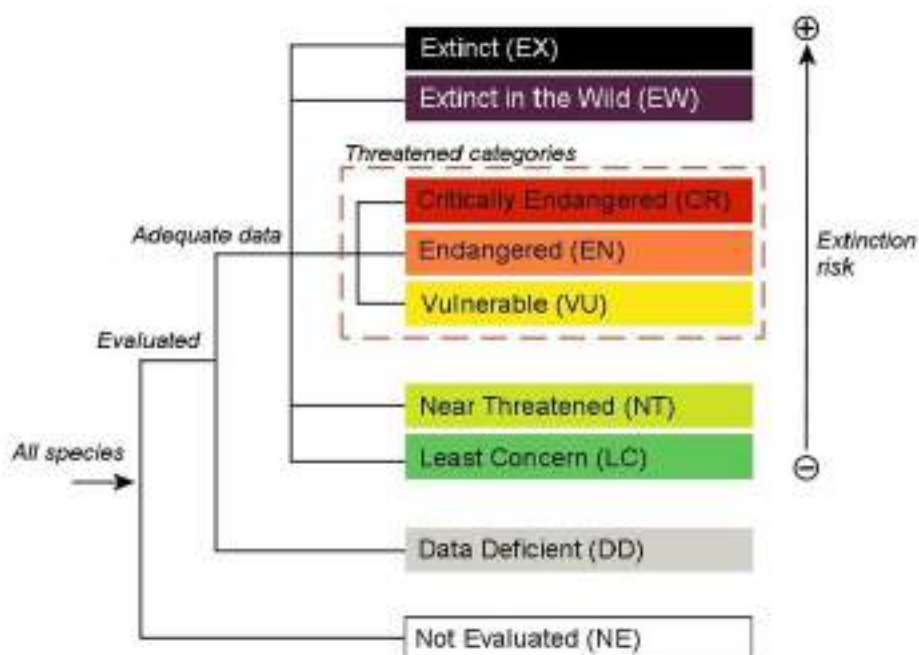
- IUCN
- Birdlife International
- EU Habitat Directive
- EU Bird Directive
- Bern Convention
- Edge of Existence Program
- World Database on Protected Areas
- RAMSAR Convention Database
- Global Critical Habitat Screening Layer
- Integrated Biodiversity Assessment Tool
- Global Biodiversity Information Facility
- World Database of Key Biodiversity Areas

#### **IUCN RED LIST OF THREATENED SPECIES**

The IUCN Red List is essentially a checklist of taxa that have undergone an extinction risk assessment on a global level using the IUCN Red List Categories and Criteria. It is a useful tool that informs biodiversity conservation actions and reforms by providing useful information about range, population size, habitat and ecology, use and threats to species of concern.

To date, many species groups including mammals, amphibians, birds, reef building corals and conifers have been comprehensively assessed. There are nine IUCN Red List categories into which species can be placed. These are illustrated in the following figure.





**Figure 10-25 IUCN Red List Categories**

The IUCN Red List uses a set of five criteria (A-E) and sub criteria each with a set of quantitative thresholds that determines which of the threatened categories a species qualifies for. The figure below outlines these qualifying criteria for each of the threatened status. These quantitative assessments form the basis for locating KBAs that make significant contributions to the global persistence of biodiversity.

EBRD PR6 CHA quantitative thresholds are derived from IUCN KBA assessment standards and are aligned with IFC's GN6.

The IUCN KBA standard cites the following definition for reproductive unit: "the minimum number and combination of mature individuals necessary to trigger a successful reproductive event at a site. Examples of five reproductive units include five pairs, five reproducing females in one harem, and five reproductive individuals of a plant species.". At non-breeding sites, the reproductive unit's threshold can be interpreted as the number of mature individuals.

CR and EN species are potential CHA triggers, as well as VU species that are in danger of up listing. Criticality is triggered if:

- EAAA contains ≥5% of global extent of unique ecosystem type with IUCN status of CR or EN
- EAAA supports ≥0.5% of the global population AND ≥ 5 reproductive units of an IUCN CR or EN species

- EAAA supports globally significant population of an IUCN VU species necessary to prevent a change of IUCN Red List status to EN or CR, and satisfies the above threshold

Species/Habitats are classified as PBFs if:

- EAAA contains <5% of the global extent of an ecosystem type with IUCN status of CR or EN
- EAAA supports <0.5% of global population OR <5 reproductive units of a CR or EN species

A spatial query has been run on the public database platform encompassing a polygon of 2,000 km<sup>2</sup>. The polygon was defined to include a region large enough to encompass a 100 km buffer around the Project area to ensure that any potential species that might have overlapping distributions were captured.

Aquatic species were not included within the search, since species such as freshwater fish are not included within the EAAA.



**Figure 10-26 Polygon Boundary for Species Query**

The potential species that may occur within the project site and meet the above PBF/CHA criteria has been compiled in Table 10-9 based on available data in the IUCN Red List of Threatened Species.

#### UZBEKISTAN RED DATA BOOK THREATENED SPECIES

Following the IUCN Red List categories, the Uzbekistan RDB lists nationally threatened species for which criticality is triggered if:

- EAAA is an ecosystem determined to be of high priority for conservation by national systematic conservation planning;
- EAAA supports important concentrations of a nationally or regionally listed EN or CR species.
- EAAA regularly holds  $\geq 10\%$  of the global population and  $\geq 10$  reproductive units of an endemic or range restricted species

Species are classified as PBFs if:

- EAAA supports regularly occurring nationally or regionally listed EN or CR species.
- EAAA holds a regularly occurring endemic or range-restricted species.

A number of nationally threatened species in the survey area with Critically Endangered (CR) and Endangered (EN) Uzbekistan RDB status were identified during the screening exercise. For a more comprehensive assessment nationally Vulnerable (VU) and Near Threatened (NT) species have also been included in this exercise.

The potential species that may occur within the project site and meet the above PBF/CHA criteria has been listed in Table 10-9 based on available data in the Uzbekistan RDB.

## **EU DIRECTIVES**

### The Habitats Directive

The Council Directive 92/43/EEC of May 1992 known as the EU Habitats Directive ensures the conservation of natural habitats and of a wide range of rare, threatened or endemic animal and plant species. Over 1,000 animal and plant species, as well as 200 habitat types, listed in the directive's annexes are protected in various ways:

- Annex I Habitats: List 233 natural European habitats types and describes priority habitats and non-priority habitats;
- Annex II species (about 900): core areas of their habitat are designated as sites of Community importance (SCIs) and included in the Natura 2000 protected area network of the EU. These sites must be managed in accordance with the ecological needs of the species;
- Annex IV species (over 400, including many annex II species): a strict protection regime must be applied across their entire natural range within the EU, both within and outside Natura 2000 sites; and
- Annex V species (over 90): Member States must ensure that their exploitation and taking in the wild is compatible with maintaining them in a favourable conservation status.

For the purpose of CHA and as per EBRD PR6, criticality is triggered if:

- EAAA is a habitat type listed in Annex 1 of EU Habitats Directive marked as "priority habitat type"
- EAAA support species and their habitats listed in Annex IV of the Habitats Directive

Species/Habitats are classified as PBFs if:

- EAAA is a habitat type listed in Annex 1 of EU Habitats Directive
- EAAA supports species and their habitats listed in Annex II of Habitats Directive,

#### The Birds Directive

The Council Directive 2009/147/EC amended in 2009 also known as the EU Bird Directive ensures protection of threatened and migratory species and their habitats.

The 500 wild bird species naturally occurring in the European Union are protected in various ways:

- Annex 1: 194 species and sub-species are particularly threatened. Member States of the EU must designate Special Protection Areas (SPAs) for their survival and all migratory bird species.
- Annex 2: 82 bird species can be hunted. However, the hunting periods are limited and hunting is forbidden when birds are at their most vulnerable: during their return migration to nesting areas, reproduction and the raising of their chicks.
- Annex 3: overall, activities that directly threaten birds, such as their deliberate killing, capture or trade, or the destruction of their nests, are banned. With certain restrictions, Member States of the EU can allow some of these activities for 26 species listed here.
- Annex 4: the directive provides for the sustainable management of hunting but Member States must outlaw all forms of non-selective and large scale killing of birds, especially the methods listed in this annex.
- Annex 5: the directive promotes research to underpin the protection, management and use of all species of birds covered by the Directive, which are listed in this annex.

For the purpose of CHA and as per EBRD PR6, species are classified as PBF if:

- EAAA supports species and their habitats listed in Annex I of Birds Directive

A number of species falling these criteria were noted during the screening process. These species are listed in Table 10-9.

#### **RESOLUTION 6 BERN CONVENTION**

The Bern Convention on the Conservation of European Wildlife and Natural Habitats, 1979 also known as the Bern Convention (or Berne Convention) was the first legally binding international

treaty with aim of bring together many countries as possible, including non-EU states, for the protection both endangered and migratory species.

As of 2019 there are 9 resolutions to the Bern Convention. Annex I of Resolution 6 (1998) identifies species requiring specific habitat conservation measures. These species are also classified as PBFs as per the EBRD PR6 CHA criteria.

A number of species falling these criteria were noted during the screening process. These species are listed in Table 10-9.

### **EDGE OF EXISTENCE PROGRAMME**

Some areas might be associated with particular evolutionary processes or a population of species that are unique in their evolutionary history.

The EDGE of Existence Programme focuses specifically on threatened species that represent a significant amount of distinct evolutionary history. The list scores species according to the amount of unique evolutionary history it represents (Evolutionary Distinctiveness, or ED), and its conservation status (Global Endangerment, or GE).

As per EBRD PR6 criteria, priority EDGE species have the potential to trigger criticality. Three EDGE species may occur in the survey area in the following order of likelihood; Egyptian Vulture (*Neophron percnopterus*), Sociable Lapwing (*Vanellus gregarius*) and Siberian Crane (*Vanellus gregarius*).

Table 10-9 lists species that satisfy this criterion. As per EBRD PR6, this criterion has no pre-determined quantitative threshold. Criticality/PBF status triggered by this criterion depends on expert judgment of the biodiversity specialist undertaking the CHA.

### **MIGRATORY AND CONGREGATING SPECIES**

Habitats supporting globally significant concentrations of a migratory or congregatory species' population where that species predictably gathers or cyclically moves from one geographical location to another.

For the purpose of CHA and as per EBRD PR6, criticality is triggered if:

- EAAA sustains  $\geq 1\%$  of the global population at any point of the species' lifecycle on a cyclical or otherwise regular basis
- EAAA predictably supports  $\geq 10\%$  of global population during periods of environmental stress caused by natural events as floods, droughts, earthquakes as well as climate change.

Species are classified as PBF if:

- EAAA supports migratory species identified as per the Birds Directive or is recognised as important for migratory birds

A screening of conservation areas that may support migratory or congregatory species within the Project site included a review of the following databases:

- Protected Areas designated on World Database of Protected Areas (protectedplanet.net)
- IBAs and Endemic Bird Areas (EBA) designated by Birdlife International (birdlife.org)
- KBAs designated by the KBA Partnership (keybiodiversityareas.org)
- Wetlands of International Importance (Ramsar Sites) designated by Ramsar, none of which were found in the study area;
- Biosphere Reserves designated by UNESCO, none of which were found in the study area;
- AZE Sites designated by the Alliance for Zero Extinction, none of which were found in the study area; and
- Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) within Natura 2000; as laid out in the EU Habitats and Birds Directives, none of which were found within the study area.

Migratory and congregating species such as migratory shorebirds and waterbirds are anticipated to potentially occur based on the location of the project within a migratory flyway as well as presence of IBAs within 100 km of the Project site. Over 160 species of birds are possibly present based on spatial distribution data, the majority of which are migratory species. Of these, 16 are listed as threatened species and eight are list as Near Threatened (NT).

Additionally, bats can also be migratory and congregating, and are highly sensitive to wind farm development. A total of eight species of bats are potentially occurring, all of which are EU Habitat Directive Annex 4 species. Table 10-9 lists the bird and bat species registered during the screening exercise that satisfy this criterion.

#### **ECOLOGICAL FUNCTIONS/KEYSTONE SPECIES**

Keystone species are an additional Critical Habitat trigger. Keystone species typically include predators, ecosystem engineers, and mutualists that provide ecological functions vital to maintaining the viability of biodiversity features. Many mammal species can be considered predators and ecosystem engineers.

Rodents and other burrowing species of reptiles play an important role in soil aeration and in providing shelter for other fauna.

Apex predators such as Grey Wolf (*Canis lupus*) are a known keystone species due to top-down control of prey populations. Additionally, insectivorous bats may play a large role in



invertebrate control, which is thought to be of great importance for agricultural crop protection.

Table 10-9 lists species that satisfy this criterion. As per EBRD PR6, this criterion has no pre-determined quantitative threshold. Criticality/PBF status triggered by this criterion depends on expert judgment of the biodiversity specialist undertaking the CHA.

#### **AREAS ASSOCIATED WITH KEY EVOLUTIONARY PROCESSES**

The structural attributes of a region, such as its topography, geology, soil, temperature, and vegetation, and combinations of these variables, can influence the evolutionary processes that give rise to regional configurations of species and ecological properties. In some cases, spatial features that are unique or idiosyncratic of the landscape have been associated with genetically unique populations or subpopulations of plant and animal species.

Physical or spatial features have been described as surrogates or spatial catalysts for evolutionary and ecological processes, and such features are often associated with species diversification. Maintaining these key evolutionary processes inherent in a landscape as well as the resulting species (or subpopulations of species) has become a major focus of biodiversity conservation in recent decades, particularly the conservation of genetic diversity. By conserving species diversity within a landscape, the processes that drive speciation, as well as the genetic diversity within species, ensures the evolutionary flexibility in a system, which is especially important in a rapidly changing climate.

For illustrative purposes, some potential examples of spatial features associated with evolutionary processes are as follows:

- Landscapes with high spatial heterogeneity are a driving force in speciation, as species are naturally selected based on their ability to adapt and diversify.
- Environmental gradients, also known as ecotones, produce transitional habitat, which has been associated with the process of speciation and high species and genetic diversity.
- Edaphic interfaces are specific juxtapositions of soil types (for example, serpentine outcrops, limestone, and gypsum deposits), which have led to the formation of unique plant communities characterized by both rarity and endemism.
- Connectivity between habitats (for example, biological corridors) ensures species migration and gene flow, which is especially important in fragmented habitats and for the conservation of metapopulations. This also includes biological corridors across altitudinal and climatic gradients and from “crest to coast.”
- Sites of demonstrated importance to climate change adaptation for either species or ecosystems are also included within this criterion.

There is little evidence to date to indicate that the landscapes within and around the Project has high levels of genetic isolation and speciation.

### 10.3.5 Spatial Context

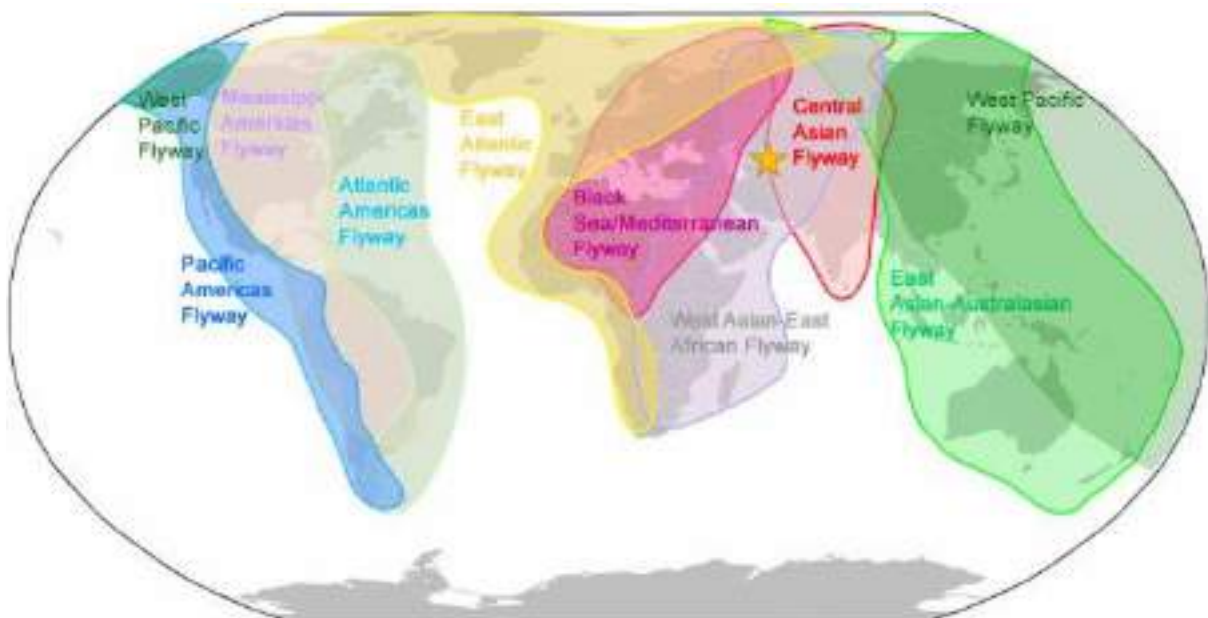
The spatial context of the Project has been set by an examination of the migratory flyways, habitats and land use/cover that can be determined from satellite imagery, as well as a compilation of all known conservation areas (such as protected areas, IBAs, KBAs, AZE sites, Ramsar sites, and any other nationally and internationally recognized areas of conservation concern).

### 10.3.6 Natural and Modified Habitats

Whilst degradation from grazing and off-road tracks are evident, the site itself is not developed; no permanent structures have been placed nor has the terrain of the area been substantially modified and thus the site could be referred to as natural habitat. Thus, the IFC definition of natural habitat has been applied. Certain sections of the southern part of the OHTL can be classed as modified habitat.

### 10.3.7 Migratory Flyways

The Project lies within the West Asian-East African Flyway and the Central Asian Flyway.

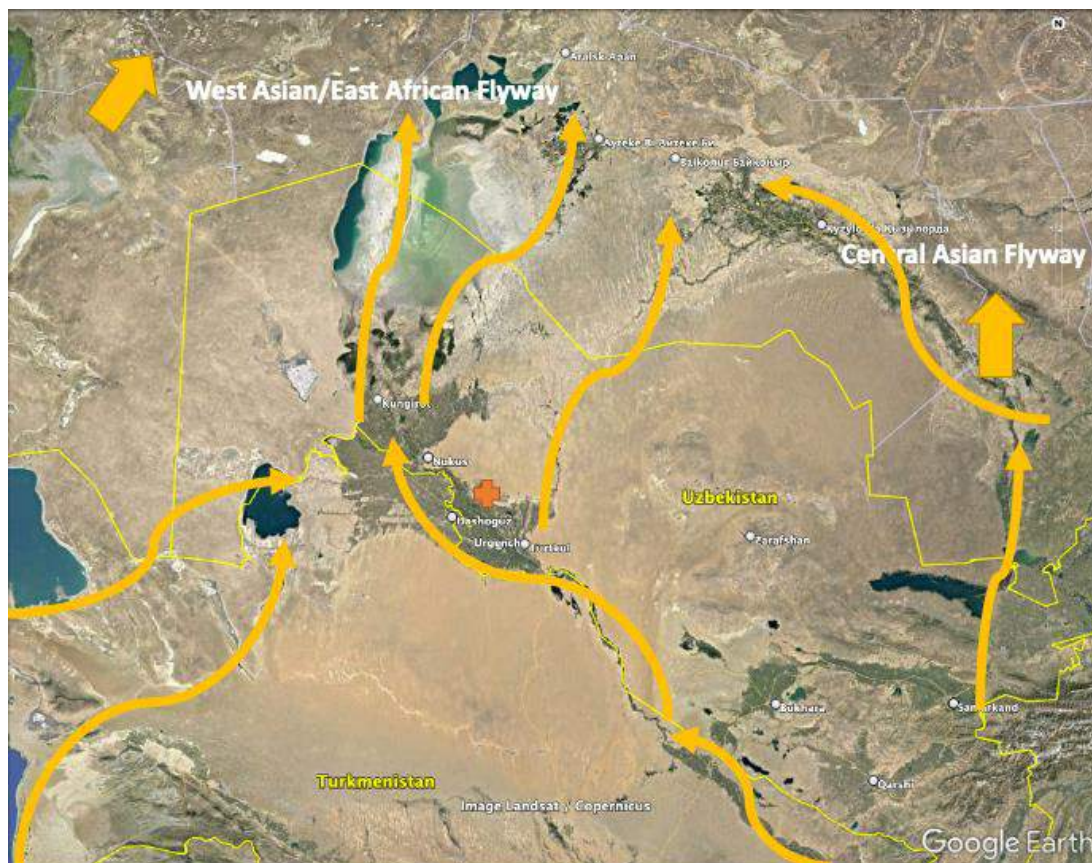


**Figure 10-27 Global Migratory Flyways**

An assessment of the landforms surrounding the Project site enables the prediction of general flight paths of migratory flocks, which typically avoids expanses of flat desert and mountain

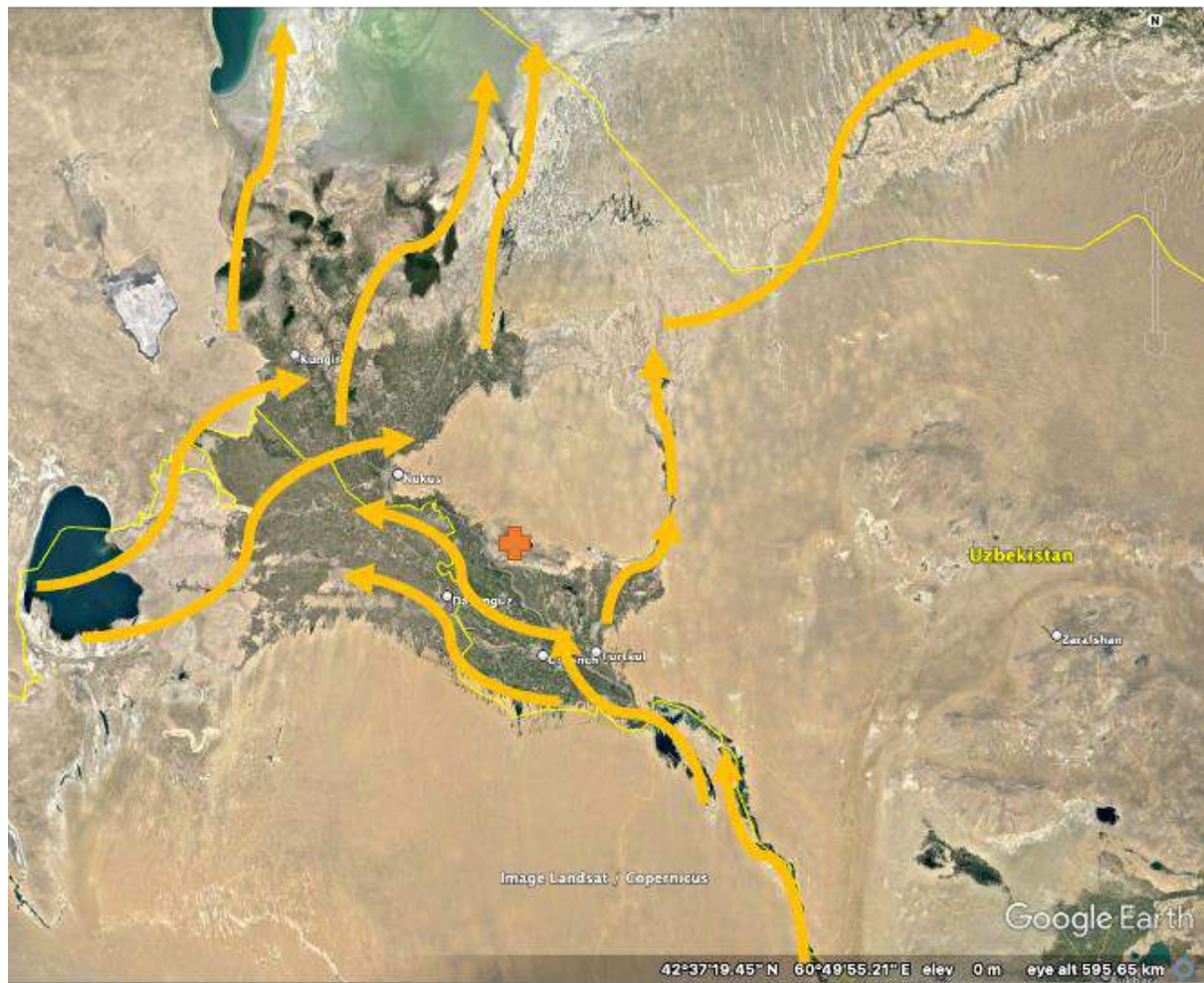
features and follows along coastlines or river deltas to wetland staging areas and stopover sites.

The following figures provide indicative migratory flight paths for northbound spring migration and southbound autumn migration. Due to the unique position of the Project location within a relatively expansive patch of desert habitat, with limited water sources apparent, it is anticipated that migratory flight traffic within the Project's airspace would be relatively low. It is not considered likely that there would be large congregations or migratory flocks utilising the project area or adjacent desert and rocky outcrop habitat as a stopover or staging area.

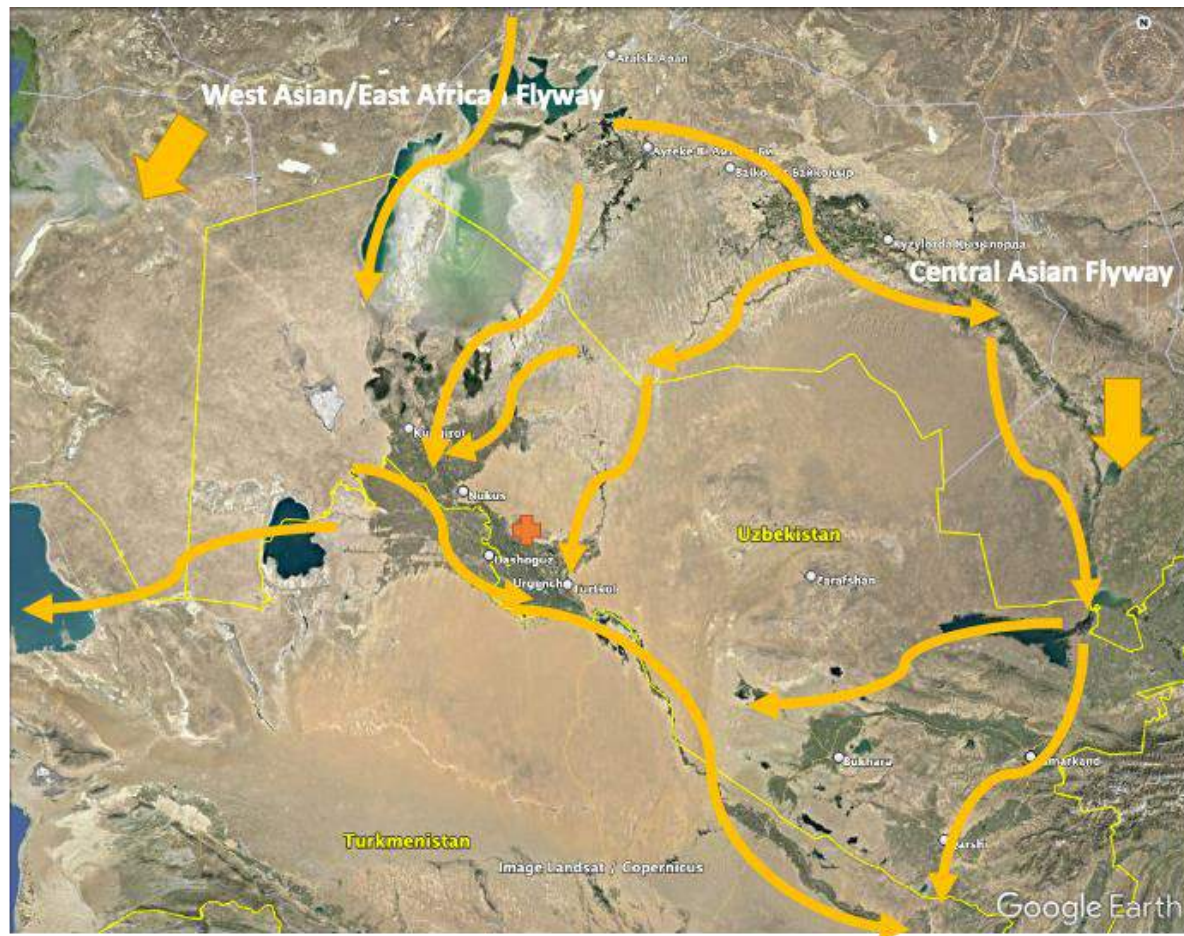


**Figure 10-28 Predicted Migratory Flight Paths – Northbound National Context**





**Figure 10-29 Predicted Migratory Flight Paths – Northbound Regional Context**



**Figure 10-30 Predicted Migratory Flight Paths – Southbound**

### 10.3.8 Areas of Conservation Importance

The review of conservation areas within the project site included a review of the following databases:

- Protected Areas designated on World Database of Protected Areas (protectedplanet.net)
- IBA and EBA
- KBA
- Wetlands of International Importance (Ramsar Sites) designated by Ramsar, none of which were found in the study area;
- Biosphere Reserves designated by UNESCO, none of which were found in the study area;
- AZE Sites; and
- SACs and SPAs.



The following table list the areas within the vicinity of the wind farm development project that are of conservation importance.

**Table 10-8 Conservation Areas within 100 km of Project**

NAME	DESIGNATION	PROXIMITY TO PROJECT AREA
Lower Amudarya Biosphere Reserve	Nationally Protected Area	15 km
Muskinata (Uzbekistan-Turkmenistan)	Important Bird Area (IBA) Key Biodiversity Area (KBA)	60 km
Khorezm Fish Farm and Adjacent Lakes	Important Bird Area (IBA) Key Biodiversity Area (KBA)	96 km

The Lower Amudarya Biosphere Reserve is located 15 km from the Project site, its location is shown in the following figure. The reserve contains riparian vegetation, including poplar forests and is home of 91 species of birds and 21 species of mammals amongst which is the rare Bukhara Red Deer.



**Figure 10-31 Protected Area – Lower Amudarya Biosphere Reserve**

The two IBAs within 100 km of the Project site; Muskinata on the Uzbekistan-Turkmenistan border and Khorezm Fish Farm and Adjacent Lakes are known to host large populations of migratory and breeding birds, however, no records of threatened species have been found at these sites.





**Figure 10-32 IBAs (Purple Polygons) within 100 km of the Project Site (Red Marker)**

**Table 10-9 IBA Trigger Criteria - Muskinata Forest**

SPECIES	CURRENT IUCN RED LIST CATEGORY	SEASON	YEAR OF ESTIMATE	POPULATION ESTIMATE	IBA CRITERIA TRIGGERED
Pygmy Cormorant <i>Microcarbo pygmaeus</i>	LC	Breeding	2007	1,000	A4i
Pallid Scops-owl <i>Otus brucei</i>	LC	Breeding	2007	2	A3
White-winged Woodpecker <i>Dendrocopos leucopterus</i>	LC	Resident	2007	1	A3
Great Tit <i>Parus major</i>	LC	Resident	2007	20 – 40	A3
Sykes's Warbler <i>Iduna rama</i>	LC	Breeding	2007	6 – 8	A3
Streaked Scrub-warbler <i>Scotocerca inquieta</i>	LC	Resident	2007	6	A3
Desert Finch <i>Rhodospiza obsoleta</i>	LC	Breeding	2007	14	A3
Red-headed Bunting <i>Emberiza bruniceps</i>	LC	Breeding	2007	4	A3

**Table 10-10 IBA Trigger Criteria - Khorezm Fish Farm and Adjacent Lakes**

SPECIES	CURRENT IUCN RED LIST CATEGORY	SEASON	YEAR OF ESTIMATE	POPULATION ESTIMATE	IBA CRITERIA TRIGGERED
Red-crested Pochard <i>Netta rufina</i>	LC	Passage	2007	3,000 – 7,000	A4i
Glossy Ibis <i>Plegadis falcinellus</i>	LC	Passage	2007	800 – 900	A4i
Black-headed Gull <i>Larus ridibundus</i>	LC	Passage	2007	6,000 – 8,000	A4i
Pallas's Gull <i>Larus ichthyæetus</i>	LC	Passage	2007	3,000 – 4,000	A4i

In addition, in 2020, the Khorezm State Natural Park was designated by Decree No. 1000 of the Cabinet of Ministers. It is made up of six individual zones which have been designated for eco-tourism purposes. The nearest zone is >34 km from the nearest WTG and the furthest is 160 km from the nearest WTG. The closest zones are shown on the following figure, with all parks to the south and southeast of the Project.



**Figure 10-33 Khorezm State Natural Park**

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### 10.3.9 Threatened Ecosystems

The area and region do not have any assessed ecosystems under consideration for the IUCN Red List of Ecosystems, and there are no designated AZE sites or other factors that allude to high evolutionary function.

The habitats within the project area and surroundings appear to be relatively typical of the region, supporting low vegetation density. It is not anticipated that the ecosystems that will be affected are of regional or global significance.

### 10.3.10 Species Checklist

The following table provides a checklist of species that possibly occur in the Project area based on IUCN, Uzbekistan RDB and BirdLife distribution data and may be classified as critical species or priority biodiversity features depending on the criteria discussed in the above sections. For a more comprehensive assessment VU and NT species have also been included in this list

**Table 10-11 Biodiversity Species Checklist**

LATIN NAMES	COMMON NAMES	IUCN STATUS	UZBEK RDB CONSERVATION STATUS	EU HABITATS DIRECTIVE ANNEX 4	EU HABITATS DIRECTIVE ANNEX 2	EU BIRDS DIRECTIVE ANNEX 1	BERN CONVENTION RESOLUTION 6	MIGRATORY / CONGREGATORY SPECIES	ENDEMIC SPECIES	EDGE OF EXISTENCE RANK	KEYSTONE SPECIES
<b>FLORA</b>											
<i>Stipa aktauensis</i>	Mexican Feathergrass		Status 2 Very Rare						✓		
<i>Lappula parvula</i>	Stickseeds		Status 1						✓		
<i>Lepidium subcordatum</i>	-		Status 2 Rare						✓		
<i>Salsola chiwensis</i>	-		Status 3 Relic								
<i>Euphorbia sclerocyathium</i>	-		Status 2 Rare						✓		
<i>Oligochaeta vvedenskyi</i>	-		Status 2 Rare						✓		
<i>Scorzonera bungei</i>	-		Status 1						✓		
<b>BIRDS</b>											
<i>Leucogeranus leucogeranus</i>	Siberian Crane	CR	CR					✓		50	
<i>Vanellus gregarius</i>	Sociable Lapwing	CR	VU				✓	✓		51	
<i>Neophron percnopterus</i>	Egyptian Vulture	EN	VU			✓	✓	✓		75	
<i>Falco cherrug</i>	Saker Falcon	EN	EN			✓	✓	✓			

LATIN NAMES	COMMON NAMES	IUCN STATUS	UZBEK RDB CONSERVATION STATUS	EU HABITATS DIRECTIVE ANNEX 4	EU HABITATS DIRECTIVE ANNEX 2	EU BIRDS DIRECTIVE ANNEX 1	BERN CONVENTION RESOLUTION 6	MIGRATORY / CONGREGATORY SPECIES	ENDEMIC SPECIES	EDGE OF EXISTENCE RANK	KEYSTONE SPECIES
<i>Oxyura leucocephala</i>	White-headed Duck	EN	EN			✓	✓	✓			
<i>Haliaeetus leucoryphus</i>	Pallas's Fish-eagle	EN	EN					✓		206	
<i>Clanga clanga</i>	Greater Spotted Eagle	VU	VU					✓			
<i>Aquila heliaca</i>	Imperial Eagle	VU	VU			✓	✓	✓			
<i>Marmaronetta angustirostris</i>	Marbled Teal	VU	VU			✓	✓	✓			
<i>Anser erythropus</i>	Lesser White-fronted Goose	VU	VU			✓	✓	✓			
<i>Aythya ferina</i>	Common Pochard	VU	NA					✓			
<i>Otis tarda</i>	Great Bustard	VU	CR			✓	✓	✓		226	
<i>Chlamydotis macqueenii</i>	Asian Houbara	VU	VU				✓	✓		250	
<i>Streptopelia turtur</i>	European Turtle-dove	VU	VU					✓			
<i>Columba eversmanni</i>	Yellow-eyed Pigeon	VU	VU					✓		677	
<i>Branta ruficollis</i>	Red-breasted Goose	VU	VU			✓	✓				
<i>Aquila rapax</i>	Tawny Eagle	VU	-								
<i>Aegypius monachus</i>	Cinereous Vulture	NT	NT			✓	✓	✓			

LATIN NAMES	COMMON NAMES	IUCN STATUS	UZBEK RDB CONSERVATION STATUS	EU HABITATS DIRECTIVE ANNEX 4	EU HABITATS DIRECTIVE ANNEX 2	EU BIRDS DIRECTIVE ANNEX 1	BERN CONVENTION RESOLUTION 6	MIGRATORY / CONGREGATORY SPECIES	ENDEMIC SPECIES	EDGE OF EXISTENCE RANK	KEYSTONE SPECIES
<i>Tetrax tetrax</i>	Little Bustard	NT	VU			✓	✓				
<i>Pelecanus crispus</i>	Dalmatian Pelican	NT	EN			✓	✓	✓			
<i>Aythya nyroca</i>	Ferruginous Duck	NT	VU			✓	✓	✓			
<i>Haematopus ostralegus</i>	Eurasian Oystercatcher	NT	NA					✓			
<i>Numenius arquata</i>	Eurasian Curlew	NT	VU					✓			
<i>Turdus iliacus</i>	Redwing	NT	NA					✓			
<i>Phasianus colchicus</i>	Common Pheasant	LC	NT								
<i>Accipiter brevipes</i>	Levant Sparrowhawk	LC	NA				✓	✓			
<i>Acrocephalus agricola</i>	Paddyfield Warbler	LC	NA					✓			
<i>Acrocephalus scirpaceus</i>	Common Reed-warbler	LC	NA					✓			
<i>Acrocephalus stentoreus</i>	Clamorous Reed-warbler	LC	NA					✓			
<i>Alauda arvensis</i>	Eurasian Skylark	LC	NA					✓			
<i>Alauda leucoptera</i>	White-winged Lark	LC	NA					✓			
<i>Alauda rufescens</i>	Lesser Short-toed Lark	LC	NA					✓			
<i>Alcedo atthis</i>	Common Kingfisher	LC	NA			✓	✓	✓			



LATIN NAMES	COMMON NAMES	IUCN STATUS	UZBEK RDB CONSERVATION STATUS	EU HABITATS DIRECTIVE ANNEX 4	EU HABITATS DIRECTIVE ANNEX 2	EU BIRDS DIRECTIVE ANNEX 1	BERN CONVENTION RESOLUTION 6	MIGRATORY / CONGREGATORY SPECIES	ENDEMIC SPECIES	EDGE OF EXISTENCE RANK	KEYSTONE SPECIES
<i>Anas platyrhynchos</i>	Mallard	LC	NA					✓			
<i>Anser anser</i>	Greylag Goose	LC	NA					✓			
<i>Anthropoides virgo</i>	Demoiselle Crane	LC	NA					✓			
<i>Anthus campestris</i>	Tawny Pipit	LC	NA			✓	✓	✓			
<i>Anthus pratensis</i>	Meadow Pipit	LC	NA					✓			
<i>Apus apus</i>	Common Swift	LC	NA					✓			
<i>Aquila chrysaetos</i>	Golden Eagle	LC	VU			✓	✓	✓			
<i>Ardea alba</i>	Great White Egret	LC	NA					✓			
<i>Ardea cinerea</i>	Grey Heron	LC	NA					✓			
<i>Ardea purpurea</i>	Purple Heron	LC	NA			✓	✓	✓			
<i>Ardeola ralloides</i>	Squacco Heron	LC	VU			✓	✓	✓			
<i>Asio flammeus</i>	Short-eared Owl	LC	NA			✓	✓	✓			
<i>Asio otus</i>	Northern Long-eared Owl	LC	NA					✓			
<i>Bombycilla garrulus</i>	Bohemian Waxwing	LC	NA					✓			
<i>Botaurus stellaris</i>	Eurasian Bittern	LC	NA				✓	✓			
<i>Burhinus oedicnemus</i>	Eurasian Thick-knee	LC	NA			✓	✓	✓			

LATIN NAMES	COMMON NAMES	IUCN STATUS	UZBEK RDB CONSERVATION STATUS	EU HABITATS DIRECTIVE ANNEX 4	EU HABITATS DIRECTIVE ANNEX 2	EU BIRDS DIRECTIVE ANNEX 1	BERN CONVENTION RESOLUTION 6	MIGRATORY / CONGREGATORY SPECIES	ENDEMIC SPECIES	EDGE OF EXISTENCE RANK	KEYSTONE SPECIES
<i>Buteo lagopus</i>	Rough-legged Buzzard	LC	NA					✓			
<i>Calandrella brachydactyla</i>	Greater Short-toed Lark	LC	NA			✓	✓	✓			
<i>Caprimulgus aegyptius</i>	Egyptian Nightjar	LC	NA					✓			
<i>Caprimulgus europaeus</i>	European Nightjar	LC	NA			✓	✓	✓			
<i>Carduelis caniceps</i>	Eastern Goldfinch	LC	NA					✓			
<i>Cercotrichas galactotes</i>	Rufous-tailed Scrub-robin	LC	NA					✓			
<i>Cettia cetti</i>	Cetti's Warbler	LC	NA					✓			
<i>Charadrius alexandrinus</i>	Kentish Plover	LC	NA			✓	✓	✓			
<i>Charadrius asiaticus</i>	Caspian Plover	LC	NA				✓	✓			
<i>Charadrius dubius</i>	Little Ringed Plover	LC	NA					✓			
<i>Charadrius leschenaultii</i>	Greater Sandplover	LC	NA				✓	✓			
<i>Chlidonias hybrida</i>	Whiskered Tern	LC	NA			✓	✓	✓			
<i>Ciconia nigra</i>	Black Stork	LC	VU			✓	✓	✓			
<i>Circaetus gallicus</i>	Short-toed Snake-eagle	LC	VU			✓	✓	✓			

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<i>Circus aeruginosus</i>	Western Marsh-harrier	LC	NA			✓	✓	✓			
<i>Circus cyaneus</i>	Hen Harrier	LC	NA			✓	✓	✓			
<i>Coracias garrulus</i>	European Roller	LC	NA			✓	✓	✓			
<i>Corvus corone</i>	Carrion Crow	LC	NA					✓			
<i>Corvus frugilegus</i>	Rook	LC	NA					✓			
<i>Corvus monedula</i>	Eurasian Jackdaw	LC	NA					✓			
<i>Coturnix coturnix</i>	Common Quail	LC	NA					✓			
<i>Crex crex</i>	Corncrake	LC	NA			✓	✓	✓			
<i>Cuculus canorus</i>	Common Cuckoo	LC	NA					✓			
<i>Curruca curruca</i>	Lesser Whitethroat	LC	NA					✓			
<i>Curruca mystacea</i>	Menetries's Warbler	LC	NA					✓			
<i>Curruca nana</i>	Asian Desert Warbler	LC	NA					✓			
<i>Cursorius cursor</i>	Cream-coloured Courser	LC	NA					✓			
<i>Cyanecula svecica</i>	Bluethroat	LC	NA					✓			
<i>Egretta garzetta</i>	Little Egret	LC	VU			✓	✓	✓			
<i>Emberiza bruniceps</i>	Red-headed Bunting	LC	NA					✓			

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<i>Emberiza citrinella</i>	Yellowhammer	LC	NA					✓			
<i>Emberiza schoeniclus</i>	Reed Bunting	LC	NA					✓			
<i>Eremophila alpestris</i>	Horned Lark	LC	NA					✓			
<i>Falco columbarius</i>	Merlin	LC	NA			✓	✓	✓			
<i>Falco naumanni</i>	Lesser Kestrel	LC	NT			✓	✓	✓			
<i>Falco peregrinus</i>	Peregrine Falcon	LC	VU					✓			
<i>Falco subbuteo</i>	Eurasian Hobby	LC	NA					✓			
<i>Falco tinnunculus</i>	Common Kestrel	LC	NA					✓			
<i>Fringilla coelebs</i>	Common Chaffinch	LC	NA			✓	✓	✓			
<i>Fulica atra</i>	Common Coot	LC	NA					✓			
<i>Galerida cristata</i>	Crested Lark	LC	NA					✓			
<i>Gelochelidon nilotica</i>	Common Gull-billed Tern	LC	NA			✓	✓	✓			
<i>Glareola pratincola</i>	Collared Pratincole	LC	NA				✓	✓			
<i>Haliaeetus albicilla</i>	White-tailed Sea-eagle	LC	VU				✓	✓			
<i>Himantopus himantopus</i>	Black-winged Stilt	LC	NA			✓	✓	✓			

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<i>Hippolais languida</i>	Upcher's Warbler	LC	NA					✓			
<i>Hirundo rustica</i>	Barn Swallow	LC	NA					✓			
<i>Hydroprogne caspia</i>	Caspian Tern	LC	NA					✓			
<i>Iduna caligata</i>	Booted Warbler	LC	NA					✓			
<i>Iduna pallida</i>	Olivaceous Warbler	LC	NA					✓			
<i>Iduna rama</i>	Sykes's Warbler	LC	NA					✓			
<i>Ixobrychus minutus</i>	Common Little Bittern	LC	NA			✓	✓	✓			
<i>Lanius excubitor</i>	Great Grey Shrike	LC	NA					✓			
<i>Lanius isabellinus</i>	Isabelline Shrike	LC	NA					✓			
<i>Lanius minor</i>	Lesser Grey Shrike	LC	NA			✓	✓	✓			
<i>Lanius phoenicuroides</i>	Red-tailed Shrike	LC	NA					✓			
<i>Larus cachinnans</i>	Caspian Gull	LC	NA					✓			
<i>Larus fuscus</i>	Lesser Black-backed Gull	LC	NA					✓			
<i>Larus genei</i>	Slender-billed Gull	LC	NA			✓	✓	✓			
<i>Larus ichthyaetus</i>	Pallas's Gull	LC	VU					✓			

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<i>Linaria flavirostris</i>	Twite	LC	NA					✓			
<i>Luscinia megarhynchos</i>	Common Nightingale	LC	NA					✓			
<i>Mareca strepera</i>	Gadwall	LC	NA					✓			
<i>Melanocorypha bimaculata</i>	Bimaculated Lark	LC	NA					✓			
<i>Merops apiaster</i>	European Bee-eater	LC	NA					✓			
<i>Merops persicus</i>	Blue-cheeked Bee-eater	LC	NA					✓			
<i>Microcarbo pygmaeus</i>	Pygmy Cormorant	LC	NT			✓	✓	✓			
<i>Milvus migrans</i>	Black Kite	LC	NA			✓	✓	✓			
<i>Motacilla alba</i>	White Wagtail	LC	NA					✓			
<i>Motacilla citreola</i>	Citrine Wagtail	LC	NA					✓			
<i>Motacilla flava</i>	Western Yellow Wagtail	LC	NA					✓			
<i>Muscicapa striata</i>	Spotted Flycatcher	LC	NA					✓			
<i>Netta rufina</i>	Red-crested Pochard	LC	NA					✓			
<i>Nycticorax nycticorax</i>	Black-crowned Night-heron	LC	NA			✓	✓	✓			



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<i>Oenanthe deserti</i>	Desert Wheatear	LC	NA					✓			
<i>Oenanthe isabellina</i>	Isabelline Wheatear	LC	NA					✓			
<i>Oenanthe picata</i>	Variable Wheatear	LC	NA					✓			
<i>Oriolus kundoo</i>	Indian Golden Oriole	LC	NA					✓			
<i>Otus brucei</i>	Pallid Scops-owl	LC	NA					✓			
<i>Passer hispaniolensis</i>	Spanish Sparrow	LC	NA					✓			
<i>Pastor roseus</i>	Rosy Starling	LC	NA					✓			
<i>Pelecanus onocrotalus</i>	Great White Pelican	LC	VU			✓	✓	✓			
<i>Phalacrocorax carbo</i>	Great Cormorant	LC	NA					✓			
<i>Phoenicopterus roseus</i>	Greater Flamingo	LC	VU				✓	✓			
<i>Phylloscopus trochiloides</i>	Greenish Warbler	LC	NA					✓			
<i>Platalea leucorodia</i>	Eurasian Spoonbill	LC	VU			✓	✓	✓			
<i>Plegadis falcinellus</i>	Glossy Ibis	LC	VU			✓	✓	✓			
<i>Podiceps cristatus</i>	Great Crested Grebe	LC	NA					✓			
<i>Podiceps nigricollis</i>	Black-necked Grebe	LC	NA					✓			

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<i>Pterocles alchata</i>	Pin-tailed Sandgrouse	LC	VU			✓	✓	✓			
<i>Pterocles orientalis</i>	Black-bellied Sandgrouse	LC	NA			✓	✓	✓			
<i>Pyrrhula pyrrhula</i>	Eurasian Bullfinch	LC	NA			✓		✓			
<i>Rallus aquaticus</i>	Western Water Rail	LC	NA					✓			
<i>Recurvirostra avosetta</i>	Pied Avocet	LC	NA			✓	✓	✓			
<i>Remiz pendulinus</i>	Eurasian Penduline-tit	LC	NA					✓			
<i>Riparia riparia</i>	Collared Sand Martin	LC	NA					✓			
<i>Saxicola caprata</i>	Pied Bushchat	LC	NA					✓			
<i>Saxicola torquatus</i>	Common Stonechat	LC	NA					✓			
<i>Spatula clypeata</i>	Northern Shoveler	LC	NA					✓			
<i>Spatula querquedula</i>	Garganey	LC	NA					✓			
<i>Spilopelia senegalensis</i>	Laughing Dove	LC	NA					✓			
<i>Sterna hirundo</i>	Common Tern	LC	NA			✓	✓	✓			
<i>Sternula albifrons</i>	Little Tern	LC	NA				✓	✓			
<i>Streptopelia orientalis</i>	Oriental Turtle-dove	LC	NA					✓			

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<i>Sturnus vulgaris</i>	Common Starling	LC	NA					✓			
<i>Sylvia borin</i>	Garden Warbler	LC	NA					✓			
<i>Syrhaptes paradoxus</i>	Pallas's Sandgrouse	LC	NA					✓			
<i>Tachybaptus ruficollis</i>	Little Grebe	LC	NA					✓			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	LC	NA			✓	✓	✓			
<i>Tadorna tadorna</i>	Common Shelduck	LC	NA					✓			
<i>Tringa totanus</i>	Common Redshank	LC	NA					✓			
<i>Turdus atrogularis</i>	Black-throated Thrush	LC	NA					✓			
<i>Turdus pilaris</i>	Fieldfare	LC	NA					✓			
<i>Upupa epops</i>	Common Hoopoe	LC	NA					✓			
<i>Vanellus leucurus</i>	White-tailed Lapwing	LC	NA					✓			
<i>Zapornia parva</i>	Little Crane	LC	NA					✓			
<i>Zapornia pusilla</i>	Baillon's Crane	LC	NA					✓			
<b>NON-VOLANT MAMMALS</b>											
<i>Gazella subgutturosa</i>	Goitered Gazelle	VU	VU				✓			432	
<i>Vormela peregusna</i>	Marbled Polecat	VU	VU	✓	✓		✓				

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<i>Lutra Lutra</i>	Eurasian Otter	NT	EN	✓	✓		✓				
<i>Mustela eversmanii</i>	Steppe Polecate	LC	VU	✓	✓		✓				
<i>Felis margarita</i>	Sand Cat	LC	NT								
<i>Vulpes corsac</i>	Corsac Fox	LC	VU								
<i>Caracal caracal</i>	Turkmen Caracal	LC	CR				✓				✓
<i>Cervus hanglu bactrianus</i>	Bukhara Red Deer	LC	EN								
<i>Salpingotus heptneri</i>	Thick-tailed Pygmy Jerboa	DD	VU								
<i>Canis lupus</i>	Grey Wolf	LC	NA				✓				✓
<i>Felis silvestris</i>	Wild Cat	LC	NA				✓				
<i>Allactaga elater</i>	Small Five-toed Jerboa	LC	LC								
<i>Allactaga severtzovi</i>	Severtzov's Jerboa	LC	LC								
<i>Allactaga sibirica</i>	Mongolian Five-toed Jerboa	LC	LC								
<i>Allactodipus bobrinskii</i>	Bobrinski's Jerboa	LC	LC								
<i>Canis aureus</i>	Golden Jackal	LC	LC								
<i>Cricetulus migratorius</i>	Grey Dwarf Hamster	LC	LC								

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<i>Dipus sagitta</i>	Northern Three-toed Jerboa	LC	LC								
<i>Ellobius talpinus</i>	Northern Mole Vole	LC	LC								
<i>Ellobius tancrei</i>	Zaisan Mole Vole	LC	LC								✓
<i>Eremodipus lichtensteini</i>	Lichtenstein's Jerboa	LC	LC								
<i>Felis chaus</i>	Jungle Cat	LC	LC								
<i>Hemiechinus auritus</i>	Long-eared Hedgehog	LC	LC								
<i>Hystrix indica</i>	Indian Porcupine	LC	LC								
<i>Jaculus blanfordi</i>	Blanford's Jerboa	LC	LC								
<i>Lepus tolai</i>	Tolai Hare	LC	LC								✓
<i>Meles leucurus</i>	Asian Badger	LC	LC								
<i>Meriones libycus</i>	Libyan Jird	LC	LC								
<i>Meriones meridianus</i>	Midday Jird	LC	LC								
<i>Meriones tamariscinus</i>	Tamarisk Jird	LC	LC								
<i>Microtus ilaeus</i>	Tien Shan Vole	LC	LC								
<i>Nesokia indica</i>	Short-tailed Bandicoot	LC	LC								

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<i>Paradipus ctenodactylus</i>	Comb-toed Jerboa	LC	LC								
<i>Pygeretmus pumilio</i>	Dwarf fat-tailed Jerboa	LC	LC								
<i>Rhombomys opimus</i>	Great Gerbil	LC	LC								✓
<i>Spermophilopsis leptodactylus</i>	Long-clawed Ground Squirrel	LC	LC								
<i>Spermophilus fulvus</i>	Yellow Ground Squirrel	LC	LC								✓
<i>Stylodipus telum</i>	Thick-tailed Three-toed Jerboa	LC	LC								
<i>Vulpes corsac</i>	Corsac Fox	LC	LC								
<i>Vulpes vulpes</i>	Red Fox	LC	LC								
<b>VOLANT MAMMALS*</b>											
<i>Rhinolophus bocharicus</i>	Bokhara Horseshoe Bat	LC	NA	✓				✓			✓
<i>Eptesicus bottae</i>	Bottas Serotine	LC	NA	✓				✓			✓
<i>Eptesicus gobiensis</i>	Gobi Big Brown Bat	LC	NA	✓				✓			✓
<i>Eptesicus serotinus</i>	Serotine Bat	LC	NA	✓				✓			✓
<i>Hypsugo savii</i>	Savii's Pipistrelle	LC	NA	✓				✓			✓



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<i>Myotis davidii</i>	David's Myotis	LC	NA	✓				✓			✓
<i>Nyctalus noctula</i>	Common Noctule	LC	NA	✓				✓			✓
<i>Pipistrellus pipistrellus</i>	Common Pipistrelle	LC	NA	✓				✓			✓
<i>Vespertilio murinus</i>	Particoloured Bat	LC	NA	✓			✓	✓			✓
<b>REPTILES</b>											
<i>Alsophylax szczerbaki</i>	Szczerbak's Even-fingered Gecko	VU	EN						✓		
<i>Naja oxiana</i>	Oxus Cobra /Central Asian Cobra	NT	NT								
<i>Teratoscincus scincus rustamowi</i>	Rustamov Plate-tailed Gecko	LC	EN								
<i>Eremias scripta pherganensis</i>	Ferghana Sand Racerunner	LC	EN								
<i>Phrynocephalus helioscopus saidalievi</i>	Sunwatcher Toad-headed Agama	LC	EN								
<i>Phrynocephalus rossikowi</i>	Khentau Toad-headed Agama	EN	EN								
<i>Varanus griseus</i>	Caspian Desert Monitor	LC	VU								
<i>Testudo horsfieldii</i>	Russian Tortoise	VU	-								✓

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<i>Eryx miliaris</i>	Desert Sand Boa	LC	NT								
<i>Eryx tataricus</i>	Tartar Sand Boa	LC	NT								
<i>Phrynocephalus moltschanowi</i>	Moltschanov Toad-head Agama	LC	NT								
<i>Natrix tessellata</i>	Dice Snake	LC	NA	✓							
<b>INVERTEBRATES</b>											
<i>Potamon ibericum</i>	-	NT	NA								
<i>Ischnura aralensis</i>	-	NT	NA								
<i>Cercinthus lehmanni</i>	Lemann's Bug	NA	VU								
<i>Eurythyrea oxiana</i>	Buprestid	NA	VU								
<i>Ancylocheira salomonii</i>	Solomon's Buprestid	NA	VU								
<i>Hypermnestra Solar</i>	-	NA	VU								
<i>Streblote fainae</i>	Turanga Lappet Moth	NA	VU								
<i>Paraglyphisia oxiana</i>	Tugay Prominent Moth	NA	VU								
<i>Catocala optima</i>	Turanga Underwing Moth	NA	VU								
<i>Eremochares mirabilis</i>	Wonderful Digger Wasp	NA	VU								

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<i>Larra transcaspica</i>	Transcaspian Digger Wasp	NA	VU								
<i>Lathrophthalmus quinquelineatus</i>	Five-striped Flowerfly	NA	VU								
<p>* The Volant Mammal section has been prepared on the recommendations of regional bat specialists. It may appear to have inconsistencies with global databases such as IUCN and IBAT (also reported in the ESA) however as bats are a globally understudied taxon, it is typically good practice to defer to regional specialists in areas which are under-represented in global databases such as Central Asia.</p>											

### 10.3.11 Ecologically Appropriate Area of Analysis

A series of Ecologically Appropriate Areas of Analysis (EAAA) has been prepared based on groupings of receptors:

- Migratory Birds – Waterbirds
- Raptors
- Ground birds
- Bats
- Mammals (Large Home Range)
- Mammals (Small Home Range)
- Reptiles (Large Home Range)
- Reptiles (Small Home Range)
- Flora

The following figures showcase the EAAA and provide the justification and reasoning behind the selection of the associated EAAA.



**Figure 10-34 EAAA - Migratory Waterbirds**

The EAAA for migratory waterbirds has been formulated taking into account typical habitat utilised by waterbirds, known IBAs, and predicted migratory flight path analysis.



**Figure 10-35 EAAA – Raptors**

The EAAA for raptors has been formulated taking into account typical habitat utilised by raptors, known IBAs, predicted migratory flight path analysis, and typical habitat utilized for hunting and breeding.





**Figure 10-36 EAAA – Groundbirds**

The EAAA for groundbirds such as Houbara has been formulated taking into account typical habitat utilised, known IBAs, and typical habitat utilized for hunting and breeding.



**Figure 10-37 EAAA – Bats**

The EAAA for bats has been formulated taking into consideration areas likely to provide foraging opportunities and roosting opportunities.



**Figure 10-38 EAAA - Mammals (Large Home Range)**



**Figure 10-39 EAAA - Mammals (Small Home Range)**



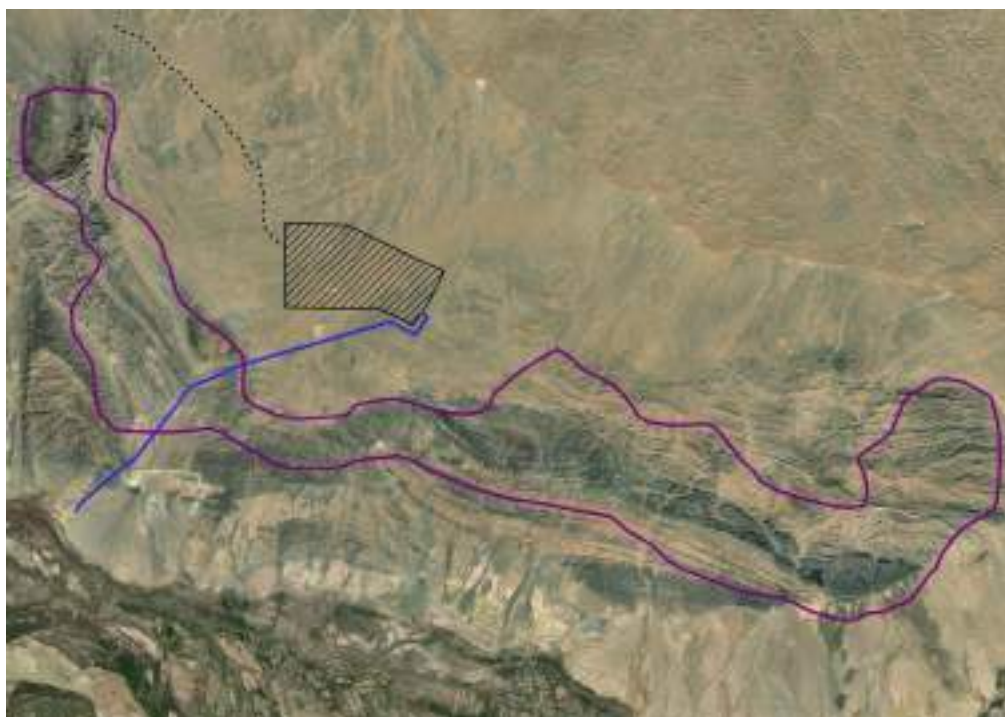
The EAAA for mammals has been formulated taking into consideration areas likely to provide foraging opportunities and suitable habitat as well as typical home range distances, barriers to movement, and habitat connectivity on the landscape level.



**Figure 10-40 EAAA - Bukhara Red Deer**

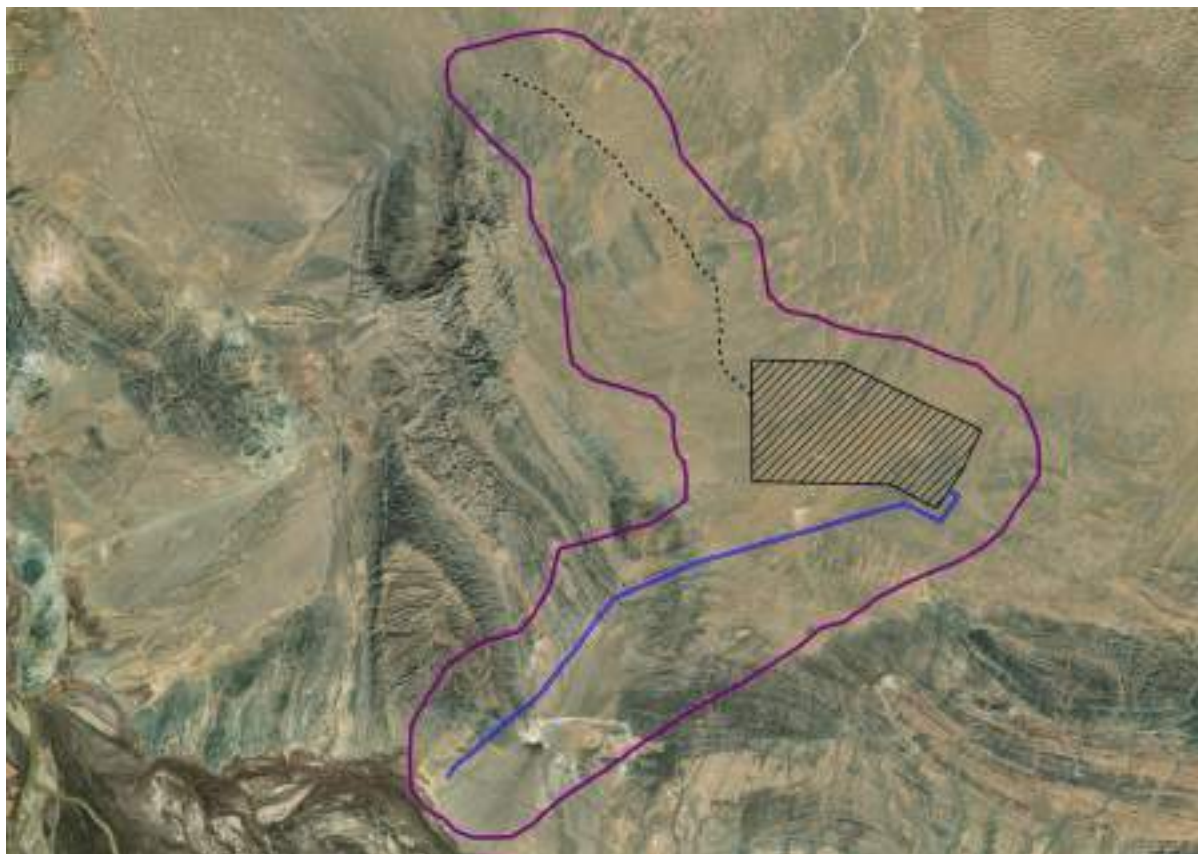


**Figure 10-41 EAAA - Reptiles (Large Home Range)**



**Figure 10-42 EAAA - Reptiles (Small Home Range)**

The EAAA for reptiles has been formulated taking into consideration areas likely to provide foraging opportunities and suitable habitat as well as typical home range distances, barriers to movement, and habitat connectivity on the landscape level.



**Figure 10-43 EAAA – Flora**

The EAAA for flora has been formulated taking into consideration a sufficient buffer boundary around the full Project footprint.

### 10.3.12 Baseline Information Available

The following list outlines the baseline surveys completed to date and considered during the CHA process:

1. Baseline Survey as part of the ESA report:
  - a. Transect and VP Surveys: September 8 – November 2, 2019
  - b. VP Surveys: November 24, 2019 – January 12, 2020
2. Bird Vantage Point Surveys (Wind Farm):
  - a. Spring: March 16 – May 15, 2020
  - b. Summer: May 16 – August 31, 2020
  - c. Autumn: September 1 – November 15, 2020
  - d. Winter: November 16<sup>th</sup>, 2020 – March 15, 2021
3. Specialised Houbara Bustard Surveys (Wind Farm)
  - a. May 2020: 4 days
  - b. June- August 2020: 18 days



- c. October – November 2020: 12 days
  - d. March 21 – April 24, 2021
4. Raptor Nesting Surveys (Wind Farm)
  - a. May 2020
  - b. June – August 2020: 18 days
  - c. March – April 2021: 7 days
5. Bird Collision Risk Modelling
6. Bird Vantage Point Survey (OHTL)
  - a. Winter 2021
  - b. Spring 2022
  - c. Summer 2022
  - d. Autumn 2022
  - e. Breeding Bird Survey - OHTL
7. Mammal Surveying:
  - a. Winter 2022
  - b. Spring 2022
  - c. Collection of camera traps up to Summer 2022
8. Reptile Surveying:
  - a. Spring 2022
  - b. Summer 2022
9. Botany Surveying:
  - a. Spring 2022
  - b. Summer 2022
10. Bat Survey (Roost searches, Passive and Active acoustic monitoring)

### 10.3.13 Critical Habitat Assessment

A CHA has been prepared, utilising the baseline information obtained to date, to provide an assessment of if criticality has been triggered for the identified species.

The following table has been prepared on the basis of literature review along with site-specific baseline information taken from the following surveys completed to date. It aims to provide a rapid assessment CHA to assess the potential for any biodiversity elements to trigger criticality.

**Table 10-12 Critical Habitat Assessment**

CHA Species	Evidence and Rationale
Sociable Lapwing	Criticality of this species would require a minimum population of 60 individuals regularly utilising the EAAA.

CHA Species	Evidence and Rationale
	The species has not been sighted in bird surveys over the surveying time frame of one year. Given its rare occurrence in the area, and lack of suitable habitat, it is unlikely that criticality will be met.
Siberian Crane	<p>Criticality of this species would require a minimum population of 17.5 individuals regularly utilising the EAAA.</p> <p>The species has not been sighted in bird surveys over the surveying time frame of one year. Given its rare occurrence in the area, and lack of suitable habitat, it is unlikely that criticality will be met.</p>
Egyptian Vulture	<p>Criticality of this species would require a minimum population of 60 individuals regularly utilizing the EAAA.</p> <p>As only one individual was recorded over the surveying timeframe of 4 seasons within wind farm Project site, and no breeding of this species is noted for the EAAA, it is highly unlikely that criticality would be triggered.</p> <p>Therefore, this species will be considered as a PBF.</p>
Houbara Bustard	<p>As this species is globally VU, criticality of this species would require a minimum population of 1% of the global population (330 individuals) utilising the EAAA as well as evidence of substantial migratory or breeding activity.</p> <p>The species has not been sighted in bird surveys to date within the Project area; including specialised surveys that were undertaken purely for Houbara Bustard. A total of three birds were sighted within the EAAA. Given the robust surveys undertaken with extremely low records, it is highly unlikely that criticality would be triggered.</p> <p>Therefore, this species will be considered as a PBF.</p>
Steppe Eagle	<p>Criticality of this species would require a minimum population of 370 individuals regularly utilising the EAAA.</p> <p>A total of 14 records have been made over the surveying timeframe of 6 seasons, and no breeding of this species is noted for the EAAA, it is highly unlikely that criticality would be triggered.</p> <p>Therefore, this species will be considered as a PBF.</p>
Eastern Imperial Eagle	<p>As this species is globally VU, criticality of this species would require a minimum population of 1% of the global population (25 individuals) utilizing the EAAA as well as evidence of substantial migratory or breeding activity.</p> <p>Surveys to date have registered 2 individuals over the surveying time frame of one year. It is highly unlikely that criticality will be triggered.</p> <p>Therefore, this species will be considered as a PBF.</p>
Tawny Eagle	<p>As this species is globally VU, criticality of this species would require a minimum population of 1% of the global population (1,000 individuals) utilising the EAAA as well as evidence of substantial migratory or breeding activity.</p> <p>As per the ESA, this species has been sighted twice during the initial transect survey in 2019. VP surveys to date have not recorded this species since. It is highly unlikely that criticality will be met.</p> <p>Therefore, this species will be considered as a PBF.</p>

CHA Species	Evidence and Rationale
European Turtle Dove	<p>As this species is globally VU, criticality of this species would require a minimum population of 1% of the global population (128,000 individuals) utilizing the EAAA as well as evidence of substantial migratory or breeding activity.</p> <p>Surveys to date have registered 38 individuals over the surveying time frame of one year. As the global population is in the excess of 12 million, it is highly unlikely that criticality will be met.</p> <p>Therefore, this species will be considered as a PBF.</p>
Saker Falcon	<p>Criticality of this species would require a minimum population of 61 individuals regularly utilising the EAAA.</p> <p>The species has not been sighted in the windfarm site during bird surveys over the surveying time frame of one year. Given its rare occurrence in the region, it is unlikely that criticality will be met.</p>
White-headed Duck	<p>Criticality of this species would require a minimum population of 53 individuals regularly utilising the EAAA.</p> <p>The species has not been sighted in bird surveys over the surveying time frame of one year. Given its rare occurrence in the area, and lack of suitable habitat, it is unlikely that criticality will be met.</p>
Pallas' Fish Eagle	<p>Criticality of this species would require a minimum population of 10 individuals regularly utilising the EAAA.</p> <p>The species has not been sighted in bird surveys over the surveying time frame of one year. Given its rare occurrence in the area, and lack of suitable habitat, it is unlikely that criticality will be met.</p>
Greater Spotted Eagle	<p>As this species is globally VU, criticality of this species would require a minimum population of 1% of the global population (39 individuals) utilising the EAAA as well as evidence of substantial migratory or breeding activity.</p> <p>The species has not been sighted in bird surveys over the surveying time frame of one year. Given its rare occurrence in the area, it is unlikely that criticality will be met.</p>
Marbled Teal	<p>As this species is globally VU, criticality of this species would require a minimum population of 1% of the global population (550 individuals) utilising the EAAA as well as evidence of substantial migratory or breeding activity.</p> <p>The species has not been sighted in bird surveys over the surveying time frame of one year. Given its rare occurrence in the area, and lack of suitable habitat, it is unlikely that criticality will be met.</p>
Lesser White-fronted Goose	<p>As this species is globally VU, criticality of this species would require a minimum population of 1% of the global population (160 individuals) utilising the EAAA as well as evidence of substantial migratory or breeding activity.</p> <p>The species has not been sighted in bird surveys over the surveying time frame of one year. Given its rare occurrence in the area, and lack of suitable habitat, it is unlikely that criticality will be met.</p>
Common Pochard	<p>As this species is globally VU, criticality of this species would require a minimum population of 1% of the global population (7,600 individuals) utilising the EAAA as well as evidence of substantial migratory or breeding activity.</p> <p>The species has not been sighted in bird surveys over the surveying time frame of one year. Given its rare occurrence in the area, and lack of suitable habitat, it is unlikely that criticality will be met.</p>

CHA Species	Evidence and Rationale
Great Bustard	<p>As this species is globally VU, criticality of this species would require a minimum population of 1% of the global population (440 individuals) utilising the EAAA as well as evidence of substantial migratory or breeding activity.</p> <p>The species has not been sighted in bird surveys over the surveying time frame of one year. Given its rare occurrence in the area, it is unlikely that criticality will be met.</p>
Yellow-eyed Pigeon	<p>As this species is globally VU, criticality of this species would require a minimum population of 1% of the global population (100 individuals) utilising the EAAA as well as evidence of substantial migratory or breeding activity.</p> <p>The species has not been sighted in bird surveys over the surveying time frame of one year. Given its rare occurrence in the area, it is unlikely that criticality will be met.</p>
Red-breasted Goose	<p>As this species is globally VU, criticality of this species would require a minimum population of 1% of the global population (440 individuals) utilising the EAAA as well as evidence of substantial migratory or breeding activity.</p> <p>The species has not been sighted in bird surveys over the surveying time frame of one year. Given its rare occurrence in the area, it is unlikely that criticality will be met.</p>
Dalmatian Pelican	<p>Although listed as NT globally, this species is listed as EN on the Uzbek Red Data Book. In order for criticality to be triggered, the EAAA would need to support a substantial portion of the national population.</p> <p>The species has not been sighted in bird surveys over the surveying time frame of one year. Given its rare occurrence in the area, and lack of suitable habitat, it is unlikely that criticality will be met.</p>
Goitered Gazelle	<p>As this species is globally VU, criticality of this species would require a minimum population of 1% of the global population (420 individuals) utilising the EAAA as well as evidence of substantial breeding activity.</p> <p>The species was recorded during the winter survey (6 records) as well as the spring survey (5 records) to date.</p> <p>The species has been known to breed in the EAAA. The surveying mammal expert has tentatively estimated a local population of 10 – 35 individuals. Thus, it is unlikely that criticality would be triggered.</p>
Marbled Polecat	<p>The global population of Marbled Polecat is not reported by IUCN or other international open data sources. A study undertaken in Bulgaria provides an estimated density of 1 individual / 10 km<sup>2</sup> throughout suitable habitat. In steppe habitat, densities are anticipated to lower due to the decreased resource availability and increased competition, thus a density of 1 individual / 50 km<sup>2</sup> has been applied. The estimated Extent of Occurrence as reported by IUCN is &gt; 200,000 km<sup>2</sup>, which would provide a rudimentary calculation of 20,000 individuals as the global population.</p> <p>As a VU species, the threshold would need to be 200 individuals regularly utilising the EAAA. As no confirmed sightings have been made to date, it is highly unlikely for criticality to be triggered.</p>
Eurasian Otter	<p>This species lives in aquatic habitats. Given that there no suitable water bodies in the Project area, this species has been scoped out (will not be considered as critical nor as a PBF).</p>

CHA Species	Evidence and Rationale
Turkmen Caracal	<p>Although listed as LC globally, this subspecies is listed as CR on the Uzbek Red Data Book. In order for criticality to be triggered, the EAAA would need to support a substantial portion of the national population.</p> <p>The total national population is unknown. A single sign indicative of caracal was found within the EAAA in the winter season. A level of uncertainty exists in the assessment for this species, but given the lack of confirmed regular presence in the EAAA, it is considered highly unlikely that criticality would be triggered.</p>
Bukhara Red Deer	<p>The Bukhara Red Deer, a subspecies of the Tarim Red Deer, is listed as EN in the RDB of Uzbekistan.</p> <p>A population of approximately 2,112 individuals inhabits the Lower Amu Darya Biosphere Reserve, considered the largest protected population of Bukhara Deer globally. The total global population of the subspecies outside of Afghanistan (for which no population estimate is available) is 2,700.</p> <p>The deer are known to pass out of the protected tugai habitat towards Nukus and on to the Sultan-Uwais remnant to graze on early-spring ephemerals in the surrounding tugai deserts and uplands. The EAAA does not include the Lower Amu Darya Biosphere Reserve and it has been confirmed by staff at the Lower Amu Darya Biosphere Reserve that the species does not go near the Project site and therefore criticality has not been triggered for this species.</p>
Szczerbak's Even-fingered Gecko	<p>This species is a regional endemic and listed as VU on the IUCN Red List as well as EN on the Uzbek RDB. In order to trigger criticality, the EAAA would need to include a substantial portion of the national population.</p> <p>The species is reported from the Ama Darya Valley; exclusively in ancient buildings and ruins. Although originally inhabited saline takyr habitat, this species can no longer be found in natural biotopes.</p> <p>This species has not been located during surveying to date. It is highly unlikely that criticality would be triggered.</p>
Rustamov Plate-tailed Gecko	<p>This subspecies is endemic to the Fergana Valley of E Uzbekistan and adjacent N Tajikistan which is located over 1,000 km away from the EAAA. Thus, it has been scoped out and will not be considered as critical nor as a PBF.</p>
Ferghana Sand Racerunner	<p>This subspecies is known only to occur in the Ferghana Valley which is located over 1,000 km away from the EAAA. Thus, it has been scoped out and will not be considered as critical nor as a PBF.</p>
Sunwatcher Toad-headed Agama	<p>This subspecies, which is listed as EN on the Uzbek RDB, is known only to occur in the Ferghana Valley which is located over 1,000 km away from the EAAA. Thus, it has been scoped out and will not be considered as critical nor as a PBF.</p>
Russian Tortoise	<p>This species is listed as VU, with an unknown global population. However, it is common, widespread and numerous in areas of suitable habitat. Although a moderate density of individuals was noted during the spring reptile survey, it is unlikely that a significant proportion of the global population (1%) would be located within the EAAA.</p>
Uzbekistan Toad-headed Agama	<p>This species is listed as EN both by IUCN and on the Uzbek Red Data Book. It was recorded from Nukus and Amu Darya Valley with an estimated total population of 2,000 – 3,000 individuals in total as of late 1990s. A total of 10 individuals in the EAAA would trigger criticality.</p>

CHA Species	Evidence and Rationale
	Despite intensive surveying, no individuals were sighted during seasonal surveys. Therefore, it is unlikely that criticality would be triggered.
Flora – Threatened, Endemic and Range-restricted Species	<p>A number of potentially endemic or range-restricted flora species were identified during the screening exercise.</p> <p>However, spring botany survey results have been examined, within which only one RDB listed species and one endemic species were noted: <i>Lepidium subcordatum</i>, a UzRDB Category 2 (Rare) species (recorded twice); and <i>Astragalus subbijugus</i>, (recorded twice) a national endemic. The abundance of both species was noted as rare.</p> <p>The limited number of records and low abundance would support a conclusion that for these species, as well as other unconfirmed threatened and endemic flora species, triggering criticality as per criterion thresholds is considered unlikely.</p>
Migratory and Congregating Species - General	<p>Migratory flight path analysis and results of a year of VP surveying indicate that it is unlikely for migratory bird species, particularly those which congregate in large numbers such as waterbirds, to congregate in globally significant numbers within or near the project site. The nearest IBAs are relatively removed and do not support substantial numbers of congregations of birds. Therefore, it is considered unlikely that the criterion threshold for migratory species would be triggered for migratory birds.</p> <p>Although acoustic monitoring showed moderate bat activity, and roosts were found within the wider area, the species found are typically sedentary and it is not considered likely for the migrating threshold to be triggered for any bat species for the project.</p>
Migratory and Congregating Species – Common Crane	<p>The Common Crane was observed during the VP surveys undertaking migratory flights in large flocks through the project airspace.</p> <p>Although the total number of individuals observed during the VP survey was relatively large (a total of 2850 during autumn VP surveying), the largest congregation at any one time was less than 900 individuals. It is considered that the 1% of global population would need to be congregated together at one time in order to trigger this criterion, and thus critical habitat is not triggered for the Common Crane (or any other waterbird).</p> <p>This is further compounded by the fact that the Project is not an IBA or near an IBA and there are:</p> <ul style="list-style-type: none"> <li>no features causing narrow bottlenecking; and</li> <li>no suitable habitat anywhere in the project site or adjacent areas for waterbird stopover/staging</li> </ul> <p>It is also noted that the altitude of flight was approximately 200 m for most flocks, which is on the edge of the risk area. Presumably future migrating flocks would either fly higher to avoid turbines or exhibit macro-avoidance around wind farms (often recorded in flocks of waterbirds).</p>

### 10.3.14 Conclusion

In conclusion, no species trigger criticality for the project, although there are some species considered as priority features / valued receptors which are mitigated and managed accordingly within this ESIA and associated documents.



## 10.4 Area of Influence and Receptors

The area of influence is the area within which Project activities may impact receptors. As different aspects carry differing spatial extents, the Aoi varies considerably. The paragraphs below provide the Aoi that was considered for each type of predicted potential impact.

### 10.4.1 Area of Influence

The area of influence for 'Habitat Loss' impacts is inclusive of the full Project construction and operation footprint, including access road and OHTL, laydown areas etc.

The area of influence for 'Direct Mortality' impacts is inclusive of the full Project construction and operation footprint, including access road and OHTL, laydown areas, as well as the airspace of the wind farm and OHTL corridor.

The area of influence for 'Habitat Degradation' impacts extends beyond the footprint of the Project inclusive of a 1 km buffer, to account for the phenomenon of edge effect.

The area of influence for 'Habitat Fragmentation' and 'Disturbance' impacts extends beyond the footprint of the Project inclusive of a 5 km buffer, to account for the phenomenon of barrier effect.

The area of influence for 'Displacement' impacts extends beyond the footprint of the Project inclusive of up to a 100 km buffer, to account for the secondary impacts of displaced wildlife into adjacent territories.

The area of influence for 'Introduced Species / Proliferation of Species' impacts extends beyond the footprint of the project inclusive of a 100 km buffer, to account for (1) potential major invasive spread and (2) secondary impacts caused by displacement of less competitive fauna into adjacent areas.

### 10.4.2 Receptors

The sensitivity rating for biodiversity receptors has been assigned as per the relative value of the receptor, a function of its global and regional status and sensitivity to possible adverse impacts and change. Certain surveys are still ongoing, namely further bat and bird surveys and therefore this table will be finalised in an ESIA addendum, however, significant changes are not anticipated.

**Table 10-13 Potential Ecological Sensitive Receptors**

RECEPTOR GROUP	RECEPTOR(S) (FEATURE OR SPECIES)	PRESENCE & AREA (CONFIRMED, POSSIBLE OR PROBABLE) (WF, OHTL, OR ROAD)	SEASONAL CONSIDERATIONS (MIGRATION, BREEDING, HIBERNATION)	JUSTIFICATION	VALUE OF RECEPTOR (AKA SENSITIVITY)
<b>Habitats</b>	"Transformed" (disturbed/developed)	Southern section of the OHTL	N/A	Anthropogenically influenced developed and disturbed land	Low
	Weakly inclined piedmonts of relic low mountains	OHTL	N/A	This habitat is common and supports typical flora and fauna assemblages. However development has placed pressure on this natural ecosystem and therefore it should not be considered as insignificant.	Medium
	Fixed shallow wavy and hilly sands	Confirmed throughout	N/A		Medium
	Weakly inclined gentle hilly slopes of relic low mountains	Confirmed throughout	N/A	This habitat, although sometimes less productive from a vegetation perspective, also hosts possible roosting and nesting locations as well as endemic and rare flora species. Therefore it is considered as	High
	Steep dry stony slopes of relic low mountains	OHTL	N/A		High

RECEPTOR GROUP		RECEPTOR(S) (FEATURE OR SPECIES)	PRESENCE & AREA (CONFIRMED, POSSIBLE OR PROBABLE) (WF, OHTL, OR ROAD)	SEASONAL CONSIDERATIONS (MIGRATION, BREEDING, HIBERNATION)	JUSTIFICATION	VALUE OF RECEPTOR (AKA SENSITIVITY)
					relatively more sensitive to development and disturbance.	
Flora	Nationally Important	<i>Lepidium subcordatum</i>	OHTL Confirmed		National endemic, endemic to relic mountains of Kyzylkum and plateau Ustyurt, listed in the Red Data Book of Uzbekistan (2019) with the Category 2 (rare)	Medium
		<i>Astragalus subbijugus</i>	OHTL Confirmed		Endemic	
	Other Flora	All other species	WF and OHTL surveys	N/A	Common species	Low
Threatened Mammals		Goitered Gazelle	WF Confirmed OHTL Confirmed Road Confirmed	Breeding in Spring	VU or NT, IUCN	High
Nationally Important Mammals		Turkmen Caracal	OHTL Confirmed. Probable throughout.	Breeding in Spring	Nationally listed on RDB	Medium

RECEPTOR GROUP	RECEPTOR(S) (FEATURE OR SPECIES)	PRESENCE & AREA (CONFIRMED, POSSIBLE OR PROBABLE) (WF, OHTL, OR ROAD)	SEASONAL CONSIDERATIONS (MIGRATION, BREEDING, HIBERNATION)	JUSTIFICATION	VALUE OF RECEPTOR (AKA SENSITIVITY)
	Corsac Fox	WF Confirmed. Probable throughout.	Breeding in Spring	Nationally listed on RDB	Medium
	Bukhara Red Deer	Confirmed present in the region, but not sighted within project footprint during surveying	Herd Migration during Spring	Nationally listed on RDB	Medium
<b>Other Mammals</b>	Tolai Hare	WF and Road confirmed; probable throughout	Breeding in Spring	Common species	Low
	Yellow Ground Squirrel	Confirmed throughout	Hibernation during deep winter; Breeding in Spring	Common species	Low
	Great Gerbil	Confirmed throughout	Breeding in Spring	Common species	Low
	Midday Gerbil	Confirmed throughout	Breeding in Spring	Common species	Low
	Asiatic Wildcat	OHTL and Road Confirmed. Probable throughout.	Breeding in Spring	Common species	Low
	Red Fox	Confirmed throughout	Breeding in Spring	Common species	Low
	Long-eared Hedgehog	Confirmed throughout	Breeding in Spring	Common species	Low
	Zaisan Mole Vole	Confirmed throughout	Breeding in Spring	Common species	Low
	Small five-toed Jerboa	Confirmed throughout	Breeding in Spring	Common species	Low
	Hairy-footed Jerboa	Confirmed throughout	Breeding in Spring	Common species	Low

RECEPTOR GROUP	RECEPTOR(S) (FEATURE OR SPECIES)	PRESENCE & AREA (CONFIRMED, POSSIBLE OR PROBABLE) (WF, OHTL, OR ROAD)	SEASONAL CONSIDERATIONS (MIGRATION, BREEDING, HIBERNATION)	JUSTIFICATION	VALUE OF RECEPTOR (AKA SENSITIVITY)
	Lichtenstein's Jerboa	Confirmed throughout	Breeding in Spring	Common species	Low
<b>Threatened Reptiles</b>	Russian Tortoise	Confirmed throughout	Active March-May	VU or NT, IUCN	High
<b>Nationally Important Reptiles</b>	Desert Sand Boa	Confirmed throughout	Active Spring/ Summer	Nationally listed on RDB	Medium
<b>Other Reptiles/Amphibians</b>	Caspian Bent-Toed Gecko <i>Tenuidactylus caspius</i>	Confirmed throughout	Active Spring/ Summer	Common species	Low
	Comb-toed gecko <i>Crossobamon eversmanni</i>	Confirmed throughout	Active Spring/ Summer	Common species	Low
	Common Wonder Gecko <i>Teratoscincus scincus</i>	Confirmed throughout	Active Spring/ Summer	Common species	Low
	Steppe agama <i>Trapelus sanguinolentus</i>	Confirmed throughout	Active Spring/ Summer	Common species	Low
	Striped racerunner <i>Eremias lineolata</i>	Confirmed throughout	Active Spring/ Summer	Common species	Low

RECEPTOR GROUP		RECEPTOR(S) (FEATURE OR SPECIES)	PRESENCE & AREA (CONFIRMED, POSSIBLE OR PROBABLE) (WF, OHTL, OR ROAD)	SEASONAL CONSIDERATIONS (MIGRATION, BREEDING, HIBERNATION)	JUSTIFICATION	VALUE OF RECEPTOR (AKA SENSITIVITY)
		Aralo-Caspian racerunner <i>Eremias intermedia</i>	Confirmed throughout	Active Spring/ Summer	Common species	Low
		Sand racer <i>Psammophis lineolatus</i>	Confirmed throughout	Active Spring/ Summer	Common species	Low
		Lichtenstein's Toadhead Agama <i>Phrynocephalus interscapularis</i>	Confirmed throughout	Active Spring/ Summer	Common species	Low
		Secret Toadhead Agama <i>Phrynocephalus mystaceus</i>	Confirmed throughout	Active Spring/ Summer	Common species	Low
Endangered Birds	Raptors	Egyptian Vulture	1 sighted during nest search survey, 0 from WF VPs or OHTL Surveys	Possibly Breeding in area. Months present include April-September	EN or CR, IUCN	Very High
		Steppe Eagle	WF – 5 ind. 5 additional sighted during nest search surveys, additional 4 sighted at OHTL	Migrating through area. Months present include March-November.	EN or CR, IUCN	Very High
Threatened Birds	Raptors	Imperial Eagle	WF – 1 ind. 1 sighted during nesting survey  None sighted during OHTL surveying	Migrating through area. Months present include February-November	VU or NT, IUCN	High
		Red-footed Falcon	1 during nesting survey, 1 at VP surveys for WF. None during OHTL surveying.	Migrating through area. Months present include March-April,	VU or NT, IUCN	High



RECEPTOR GROUP		RECEPTOR(S) (FEATURE OR SPECIES)	PRESENCE & AREA (CONFIRMED, POSSIBLE OR PROBABLE) (WF, OHTL, OR ROAD)	SEASONAL CONSIDERATIONS (MIGRATION, BREEDING, HIBERNATION)	JUSTIFICATION	VALUE OF RECEPTOR (AKA SENSITIVITY)
				September-November		
	<b>Groundbirds</b>	Houbara Bustard	Possible in low densities (confirmed adjacent but not confirmed on site)	Unlikely to be breeding on site	VU or NT, IUCN	High value / low certainty
	<b>Passeries &amp; Allies</b>	European Turtle-dove	WF – 38 ind.	Migrating through area. Months present include March-April, September-November	VU or NT, IUCN	High
<b>Nationally Important Birds</b>	<b>Raptors</b>	Golden Eagle	WF – 6 ind. During nesting survey – 11 ind. OHTL – 6 individuals sighted to date	Year-round resident, breeding in area March-July months	Nationally listed on RDB	Medium
		White-tailed Sea Eagle	1 sighted during OHTL only	Passage migrant and possible winter visitor	Nationally listed on RDB	Medium
<b>Other Birds</b>	<b>Raptors</b>	Eurasian Marsh Harrier; N. Hen Harrier; Rough-legged Hawk; Common Buzzard; Long-legged Buzzard; Eurasian/Common Kestrel;	Confirmed or probable throughout	Migrating through area. Months present include March-August, September-November,	Common Species	Low

RECEPTOR GROUP		RECEPTOR(S) (FEATURE OR SPECIES)	PRESENCE & AREA (CONFIRMED, POSSIBLE OR PROBABLE) (WF, OHTL, OR ROAD)	SEASONAL CONSIDERATIONS (MIGRATION, BREEDING, HIBERNATION)	JUSTIFICATION	VALUE OF RECEPTOR (AKA SENSITIVITY)
				December-February		
	<b>Waterbirds</b>	Common Crane	WF, OHTL Confirmed	Migrating during March-April, September-October	Common Species	Low
	<b>Groundbirds</b>	Black-bellied Sandgrouse; Chukar	Confirmed or probable throughout	The black-bellied sandgrouse is a Year-round resident, breeding in area of March-July	Common Species	Low
	<b>Nocturnal</b>	Egyptian Nightjar; Little Owl	Confirmed or probable throughout	Egyptian Nightjar-breeding in the area from April to July Little Owl is a year-round resident	Common Species	Low
	<b>Passeries &amp; Allies</b>	All others (refer to baseline results)	Confirmed or probable throughout	N/A	Common Species	Low
<b>Non-threatened Bats</b>		<i>Eptesicus bottae</i> <i>Eptesicus serotinus</i> <i>Pipistrellus pipistrellus</i>	Confirmed via roost and/or acoustic monitoring surveys	Active season May – October	Common Species	Low
		<i>Rhinolophus bocharicus</i> <i>Eptesicus gobiensis</i> <i>Hypsugo savii</i> <i>Myotis davidii</i> <i>Nyctalus noctula</i>	Possible but not identified	-	Common Species	Low

RECEPTOR GROUP	RECEPTOR(S) (FEATURE OR SPECIES)	PRESENCE & AREA (CONFIRMED, POSSIBLE OR PROBABLE) (WF, OHTL, OR ROAD)	SEASONAL CONSIDERATIONS (MIGRATION, BREEDING, HIBERNATION)	JUSTIFICATION	VALUE OF RECEPTOR (AKA SENSITIVITY)
	<i>Vespertilio murinus</i> <i>Pipistrellus aladdin</i>				

## 10.5 Potential Impacts, Mitigation, Management & Residual Impacts

### 10.5.1 Construction Phase

#### 10.5.1.1 Ecosystem Function

##### HABITAT LOSS

Clearing, grading, excavation and other earthworks during early construction stages results in direct habitat loss over the construction footprint of the project, including temporary structures, lay-down areas, and access road.

Habitat loss is a high intensity impact which affects both vegetation and wildlife species that currently use the affected areas as well as overarching ecosystem function on a wider regional scale. Vegetation cannot re-establish in impermeable paving or compacted soils, and wildlife dependent upon natural features and resources cannot utilise the converted land which restricts available habitat regionally. Ecosystem function will be degraded as a result.

The habitat loss will mainly impact the 'weakly inclined gentle hilly slopes of relic low mountains' and 'fixed shallow wavy and hilly sands' habitats as this is where the access road, WTGs, temporary facilities and substations will be. The habitat along the OHTL will not be as impacted due to the limited land take required.

The Magnitude of loss of each type of habitat has been based on the overall amount of loss, as well as the overall landscape context of available habitat.

**Table 10-14 Unmitigated Significance of Habitat Loss**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Weakly inclined gentle hilly slopes of relic low mountains	High	Moderate	<b>Moderate</b>
Fixed shallow wavy and hilly sands	Medium	Moderate	<b>Moderate</b>

However, maintaining strict requirements to minimise the construction buffer as much as practicable will reduce the magnitude of habitat loss impact. Further, habitat loss in areas disturbed during construction but falling outside of the physical footprint of the infrastructure is reversible.

There will be post-construction restoration of affected areas to natural habitat conditions. The exact scope and methodology will be detailed in a Habitat Restoration Plan. This reduces the

spatial extent of the impact and thus reduces the magnitude of impact where possible. Post-construction restoration via seeding, re-planting, and landscaping with native species in naturally occurring assemblages and communities. The Habitat Restoration Plan will outline the methods and requirements for post-construction restoration.

**Table 10-15 Residual Significance of Habitat Loss**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Weakly inclined gentle hilly slopes of relic low mountains	High	Minor	<b>Minor</b>
Fixed shallow wavy and hilly sands	Medium	Minor	<b>Minor</b>

### 10.5.1.2 Biodiversity Loss

#### EARTHWORKS CLEARING / EXCAVATION

Clearing of existing vegetation will result in direct loss and mortality of removed specimens. Further, burrowing wildlife such as rodents and reptiles may be directly crushed during earthworks or may suffer stress-induced mortality. This impact covers the full spatial extent of the construction footprint and is irreversible and permanent. For vegetation it is certain to occur while for burrowing fauna it is probable to occur. Thus, the magnitude of impact is considered as Moderate for impacted species. The magnitude and unmitigated significance calculations are presented in the following table.

Table 10-16 Unmitigated Significance of Vegetation Removal

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Nationally Important Flora	Medium	Moderate	<b>Moderate</b>
Other Flora	Low	Moderate	<b>Minor</b>

**Table 10-17 Unmitigated Significance of Earthworks Mortality**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Threatened Mammals (Goitered Gazelle)	High	Negligible	<b>Minor</b>
Nationally Important Mammals (Caracal, Corsac Fox, Bukhara Red Deer)	Medium	Negligible	<b>Minor</b>

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Other Mammals (Hare, Ground Squirrel, Gerbil, etc.)	Low	Moderate	Minor
Threatened Reptiles (Russian Tortoise)	High	Moderate	Major
Nationally Important Reptiles (Desert Sand Boa)	Medium	Moderate	Moderate
Other Reptiles	Low	Moderate	Minor

The following mitigation measures will be implemented:

- A pre-construction Survey is required to take place during the active season for *Lepidium subcordatum* in order to identify all specimens within the full construction footprint. These specimens shall either be retained in-situ or translocated. The specimens identified in the baseline survey (at 150 m and 300 m distance from the OHTL) will be retained in-situ and clearly demarcated. In addition, training will be provided to contractors on the conservation importance of this species.
- A Pre-construction Survey is required to take place to identify suitable release sites for the Russian Tortoise. The release sites should be ideal habitat for the tortoise and should have enough carrying capacity to support the addition of relocated tortoises. Tortoise exclusion fencing and/or barrier(s) should be installed to prevent re-entry into the construction footprint once relocated. Relocation efforts must take place during the tortoise active season of March and April. Construction should only take place in areas where tortoises have been captured and relocated away in the previous season.
- For other species, chance-find procedures with individual relocations as deemed necessary is sufficient. Chance Find Procedure will be included within the CESMP to provide general guidance on potential ecological triggers for work stoppage

These measures reduce the spatial extent, intensity and likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-18 Residual Significance of Vegetation Removal**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Nationally Important Flora	Medium	Minor	Minor
Other Flora	Low	Minor	Negligible



**Table 10-19 Residual Significance of Earthworks Mortality**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Threatened Mammals (Goitered Gazelle)	High	Negligible	Minor
Nationally Important Mammals (Caracal, Corsac Fox, Bukhara Red Deer)	Medium	Negligible	Minor
Other Mammals (Hare, Ground Squirrel, Gerbil, etc.)	Low	Minor	Negligible
Threatened Reptiles (Russian Tortoise)	High	Minor	Minor
Nationally Important Reptiles (Desert Sand Boa)	Medium	Minor	Minor
Other Reptiles	Low	Minor	Negligible

#### VEHICULAR COLLISION

Wildlife can be runover or collide with, motorised vehicles and equipment.

Vehicle-related death from construction trucks and machinery are less of a concern for larger mammals such as gazelle and fox which are more likely to disperse in time to avoid collision (as the site vehicles will be traveling under speed restrictions and large equipment movement such as cranes and turbine parts will be very slow).

Small to medium sized wildlife such as hare, hedgehog and rodents, tortoise, lizards, snakes and amphibians have a higher chance of mortality from construction vehicular and machinery collisions. This could also apply to raptors and other opportunistic birds which may scavenge from roadkill.

This impact is direct, a low intensity of change, with a spatial extent covering the construction footprint; it is irreversible with a long-term duration. It is considered as possible to occur. Thus, the magnitude of impact is considered as Minor to Moderate, depending on the species. The magnitude and unmitigated significance calculations are presented in the following table.

**Table 10-20 Unmitigated Significance of Vehicular Collision**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Goitered Gazelle	High	Minor	Minor
Turkmen Caracal	Medium	Minor	Minor
Corsac Fox	Medium	Minor	Minor

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Bukhara Red Deer	Medium	Minor	Minor
Wild Cat, Red Fox	Low	Minor	Negligible
Tolai Hare, Yellow Ground Squirrel, Gerbils and Jerboas, Mole Vole, Hedgehog	Low	Moderate	Minor
Russian Tortoise	High	Moderate	Moderate
Sand Boa	Medium	Moderate	Moderate
Other Reptiles	Low	Moderate	Minor
Egyptian Vulture, Steppe Eagle,	Very High	Moderate	Major
Imperial Eagle	High	Moderate	Moderate
Houbara Bustard	High	Moderate	Moderate
Golden Eagle, White-tailed Sea Eagle	Medium	Moderate	Moderate
Other Raptors	Low	Moderate	Minor
Other Groundbirds	Low	Moderate	Minor

However, the following mitigation measures will be implemented to reduce the risk from these potential impacts:

- Strict speed controls which will be enforced by EPC HSE and Security teams;
- Ban against driving outside of delineated access roads and restricting driving and machinery operation to daylight hours;
- Protocol for removal of any road-kill carcasses immediately upon observation to at least 10 m away from the access roads.
- These measures shall be captured in the CESMP and shall be implemented and monitored.

These measures reduce the intensity and likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-21 Residual Significance of Vehicular Collision**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Goitored Gazelle	High	Negligible	Minor
Turkmen Caracal	Medium	Negligible	Minor
Corsac Fox	Medium	Negligible	Minor
Bukhara Red Deer	Medium	Negligible	Minor
Wild Cat, Red Fox	Low	Negligible	Negligible
Tolai Hare, Yellow Ground Squirrel, Gerbils and Jerboas, Mole Vole, Hedgehog	Low	Minor	Negligible
Russian Tortoise	High	Minor	Minor
Sand Boa	Medium	Minor	Minor
Other Reptiles	Low	Minor	Negligible
Egyptian Vulture, Steppe Eagle	Very High	Minor	Minor
Imperial Eagle	High	Minor	Minor
Houbara Bustard	High	Minor	Minor
Golden Eagle, White-tailed Sea Eagle	Medium	Minor	Minor
Other Raptors	Low	Minor	Negligible
Other Groundbirds	Low	Minor	Negligible

#### **“TAKE” POACHING, HUNTING AND GATHERING**

The presence of site workers can lead to increased hunting, poaching, or gathering on site. Flora and vegetative matter might be gathered for consumption or for fuel; eggs taken from breeding bird nests; poaching of hare, ground birds or tortoise for consumption or for domestic trade; and persecution of raptors, snakes, and carnivores could potentially take place.

This direct impact has low intensity, with a spatial extent of the full construction footprint, is long-term and irreversible, with a possible likelihood. Thus, the magnitude of impact is considered as Minor to Moderate, depending on the species.

**Table 10-22 Unmitigated Significance of “Take”**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Nationally Important Flora	Medium	Moderate	<b>Moderate</b>
Other Flora	Low	Moderate	<b>Minor</b>
Goitored Gazelle	High	Minor	<b>Minor</b>
Turkmen Caracal, Corsac Fox, Bukhara Red Deer	Medium	Minor	<b>Minor</b>
Wild Cat, Red Fox	Low	Minor	<b>Minor</b>
Tolai Hare, Yellow Ground Squirrel, Gerbils and Jerboas, Mole Vole, Hedgehog	Low	Moderate	<b>Minor</b>
Russian Tortoise	High	Moderate	<b>Moderate</b>
Sand Boa	Medium	Moderate	<b>Moderate</b>
Other Reptiles	Low	Moderate	<b>Minor</b>
Egyptian Vulture, Steppe Eagle	Very High	Minor	<b>Moderate</b>
Imperial Eagle	High	Minor	<b>Minor</b>
Houbara Bustard	High	Moderate	<b>Moderate</b>
Golden Eagle, White-tailed Sea Eagle	Medium	Minor	<b>Minor</b>
Other Raptors	Low	Minor	<b>Minor</b>
Other Groundbirds	Low	Moderate	<b>Moderate</b>

However, the following mitigation measures will be implemented to reduce the risk of these potential impacts occurring:

- Strict controls forbidding the gathering, poaching or otherwise disturbance of any flora or fauna on site, included in induction training.
- Staff training such as toolbox talks on the importance of ecosystem integrity, especially focused on species of importance.
- It should be noted that any illegal hunting is punishable by the regulator SCEEP via the issuance of fines.
- These measures shall be captured in the CESMP and shall be implemented and monitored.

These measures reduce the likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-23 Residual Significance of “Take”**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Nationally Important Flora	Medium	Negligible	Minor
Other Flora	Low	Negligible	Negligible
Goitered Gazelle	High	Negligible	Minor
Turkmen Caracal, Corsac Fox, Bukhara Red Deer	Medium	Negligible	Minor
Wild Cat, Red Fox	Low	Negligible	Negligible
Tolai Hare, Yellow Ground Squirrel, Gerbils and Jerboas, Mole Vole, Hedgehog	Low	Negligible	Negligible
Russian Tortoise	High	Negligible	Minor
Sand Boa	Medium	Negligible	Minor
Other Reptiles	Low	Negligible	Negligible
Egyptian Vulture, Steppe Eagle	Very High	Negligible	Minor
Imperial Eagle	High	Negligible	Minor
Houbara Bustard	High	Negligible	Minor
Golden Eagle, White-tailed Sea Eagle	Medium	Negligible	Minor
Other Raptors	Low	Negligible	Negligible
Other Groundbirds	Low	Negligible	Negligible

#### LITTERING

Improper management of solid waste such as plastic containers and plastic bags, may result in wind-blown litter, which are a danger to wildlife due to entanglement or ingestion.

This direct impact has low intensity, with a spatial extent that could extend to regional, is reversible and short-term, with a possible likelihood. Thus, the magnitude of impact is considered as Minor.

**Table 10-24 Unmitigated Significance of Littering**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Goitered Gazelle	High	Minor	<b>Moderate</b>
Turkmen Caracal, Corsac Fox, Bukhara Red Deer	Medium	Minor	<b>Minor</b>
Wild Cat, Red Fox	Low	Minor	<b>Minor</b>
Tolai Hare, Yellow Ground Squirrel, Gerbils and Jerboas, Mole Vole, Hedgehog	Low	Minor	<b>Minor</b>
Russian Tortoise	High	Minor	<b>Moderate</b>
Sand Boa	Medium	Minor	<b>Minor</b>
Other Reptiles	Low	Minor	<b>Minor</b>
Egyptian Vulture, Steppe Eagle	Very High	Minor	<b>Moderate</b>
Imperial Eagle, Red-Footed Falcon, Houbara Bustard, Turtle-dove	High	Minor	<b>Moderate</b>
Golden Eagle, White-tailed Sea Eagle	Medium	Minor	<b>Minor</b>
Other birds	Low	Minor	<b>Minor</b>

However, the following mitigation measures will be implemented to reduce the risk of these potential impacts:

- Preparation of a Waste Management Plan as one of the supplementary plans to the CESMP;
- Strict waste management supervision and controls under the HSE Team;
- Zero tolerance for littering on site;
- Daily inspections and clean-up of litter by EPC/sub-contractor(s) responsible
- These measures shall be captured in the CESMP.

These measures reduce the intensity and likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.



**Table 10-25 Residual Significance of Littering**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Goitored Gazelle	High	Negligible	Minor
Turkmen Caracal, Corsac Fox, Bukhara Red Deer	Medium	Negligible	Minor
Wild Cat, Red Fox	Low	Negligible	Negligible
Tolai Hare, Yellow Ground Squirrel, Gerbils and Jerboas, Mole Vole, Hedgehog	Low	Negligible	Negligible
Russian Tortoise	High	Negligible	Minor
Sand Boa	Medium	Negligible	Minor
Other Reptiles	Low	Negligible	Negligible
Egyptian Vulture, Steppe Eagle	Very High	Negligible	Moderate
Imperial Eagle, Red-Footed Falcon, Houbara Bustard, Turtle-dove	High	Negligible	Minor
Golden Eagle, White-tailed Sea Eagle	Medium	Negligible	Minor
Other birds	Low	Negligible	Negligible

#### **DISTURBANCE**

The presence of anthropogenic activity is disturbing to many sensitive species, which can result in reduced survivorship, reproductive success, and ultimately, population decline.

Wildlife which is not already habituated to anthropogenic disturbance is anticipated to be negatively affected.

Disturbance especially impacts the reproductive success of breeding birds, which may abandon breeding attempts, or desert nests or colonies if disturbance levels are unacceptable.

This direct impact has low intensity, with a spatial extent of the full construction footprint and a 1 km buffer, is short-term and reversible, with a possible likelihood.

Thus, the magnitude of impact is considered as Minor. The magnitude and unmitigated significance calculations are presented in the following table.

**Table 10-26 Unmitigated Significance of Disturbance**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Threatened Mammals	High	Minor	<b>Moderate</b>
Nationally Important Mammals	Medium	Minor	<b>Minor</b>
Other Mammals	Low	Minor	<b>Minor</b>
Threatened Reptiles	High	Minor	<b>Minor</b>
Nationally Important Reptiles	Medium	Minor	<b>Minor</b>
Other Reptiles	Low	Minor	<b>Minor</b>
Endangered Birds	Very High	Minor	<b>Moderate</b>
Threatened Birds	High	Minor	<b>Minor</b>
Nationally Important Birds	Medium	Minor	<b>Minor</b>
Other Birds	Low	Minor	<b>Minor</b>

However, the following mitigation measures will be implemented to minimise the magnitude of these potential impacts:

- Minimise construction footprint buffer zones and temporary laydown areas.
- Minimise duration of construction period avoiding most sensitive months/seasons where possible.
- These measures shall be captured in the CESMP.

These measures reduce the duration, spatial extent, intensity and likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-27 Residual Significance of Disturbance**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Threatened Mammals	High	Negligible	<b>Minor</b>
Nationally Important Mammals	Medium	Negligible	<b>Minor</b>
Other Mammals	Low	Negligible	<b>Negligible</b>
Threatened Reptiles	High	Negligible	<b>Minor</b>
Nationally Important Reptiles	Medium	Negligible	<b>Minor</b>
Other Reptiles	Low	Negligible	<b>Negligible</b>

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Endangered Birds	Very High	Negligible	Minor
Threatened Birds	High	Negligible	Minor
Nationally Important Birds	Medium	Negligible	Minor
Other Birds	Low	Negligible	Negligible

### 10.5.1.3 Biodiversity Displacement

#### DISPERSAL

Shyer species may be displaced away from the Project area as a result of construction disturbance, having indirect secondary impacts on adjacent territories via increased competition for resources compromising population stability, causing ecosystem imbalances.

This indirect impact has major intensity, with a regional spatial extent, is long-term but reversible, with a probable likelihood. Thus, the magnitude of impact is considered as Moderate.

**Table 10-28 Unmitigated Significance of Displacement**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Goitered Gazelle	High	Moderate	Moderate
Turkmen Caracal, Corsac Fox, Bukhara Red Deer	Medium	Moderate	Moderate
Wild Cat, Red Fox	Low	Moderate	Minor
Tolai Hare, Yellow Ground Squirrel, Gerbils and Jerboas, Mole Vole, Hedgehog	Low	Moderate	Moderate
Russian Tortoise	High	Moderate	Moderate
Sand Boa	Medium	Moderate	Minor
Other Reptiles	Low	Moderate	Minor
Houbara Bustard, Turtle-dove	High	Moderate	Moderate
Other birds	Low	Moderate	Minor

However, the following mitigation measures will be implemented to minimise the magnitude of these potential impacts:

- Minimise, where possible, construction footprint buffer zones and temporary laydown areas.
- Minimise duration of construction period avoiding most sensitive months/seasons where possible.
- These measures shall be captured in the CESMP.
- Rehabilitation post-construction to restore as much habitat as possible.

These measures reduce the duration, spatial extent, intensity and likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-29 Residual Significance of Displacement**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Goitered Gazelle	High	Negligible	Minor
Turkmen Caracal, Corsac Fox, Bukhara Red Deer	Medium	Negligible	Minor
Wild Cat, Red Fox	Low	Negligible	Negligible
Tolai Hare, Yellow Ground Squirrel, Gerbils and Jerboas, Mole Vole, Hedgehog	Low	Negligible	Negligible
Russian Tortoise	High	Negligible	Minor
Sand Boa	Medium	Negligible	Minor
Other Reptiles	Low	Negligible	Negligible
Egyptian Vulture	Very High	Negligible	Moderate
Houbara Bustard, Turtle-dove	High	Negligible	Minor
Other birds	Low	Negligible	Negligible

#### PROLIFERATION OF GENERALIST SPECIES

The dispersal of shy species away from disturbed areas can lead to an increase in generalist species such as Red Fox which are well adapted to anthropogenic habitats.

Further, poor management of solid waste can result in the proliferation of pest species, such as feral dog, cat, rats, and other urban-adapted species. This can cause further competition and displacement of native fauna.

This direct impact has low intensity, with a spatial extent of the full construction footprint, is long-term and reversible, with a possible likelihood. Thus, the magnitude of impact is considered as Moderate.

**Table 10-30 Unmitigated Significance of Proliferation**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Goitered Gazelle (competition with domestic/feral grazers)	High	Moderate	<b>Moderate</b>
Turkmen Caracal, Corsac Fox, Bukhara Red Deer (competition with domestic/feral grazers, feral dogs/cats and Red Fox)	Medium	Moderate	<b>Minor</b>
Wild Cat (competition with feral cats)	Low	Moderate	<b>Minor</b>
Gerbils and Jerboas (competition with feral rodents)	Low	Moderate	<b>Minor</b>

However, the following mitigation measures will be implemented to minimize the magnitude of these potential impacts:

- Development of a solid waste management strategy.
- Preparation of a Waste Management Plan as one of the supplementary plans to the CESMP.
- Strict waste management supervision and controls under the HSE Team.
- Zero tolerance for littering on site.
- Daily inspections and clean-up of litter by EPC/sub-contractor(s) responsible.
- No provision of food waste for feral cats and dogs.
- These measures shall be captured in the CESMP and shall be implemented and monitored.

These measures reduce the intensity and likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-31 Residual Significance of Proliferation**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Goitered Gazelle (competition with domestic/feral grazers)	High	Minor	<b>Minor</b>
Turkmen Caracal, Corsac Fox, Bukhara Red Deer (competition with domestic/feral grazers, feral dogs/cats and Red Fox)	Medium	Minor	<b>Minor</b>

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Wild Cat (competition with feral cats)	Low	Minor	<b>Negligible</b>
Gerbils and Jerboas (competition with feral rodents)	Low	Minor	<b>Negligible</b>

#### 10.5.1.4 Biosecurity

##### INTRODUCTION OF INVASIVE PATHOGENS

Soil imports, intentional or via previously used excavation and earthworks equipment, may contain pathogens that can spread and infect native vegetation and fauna that do not have natural defence mechanisms.

Exotic seeds in soil imports can allow the spread of invasive, weedy species which outcompete native species. Secondary impacts may occur on wildlife which utilise the reduced native vegetation for foraging or shelter.

This direct impact has low intensity, with a regional spatial extent, is long-term and irreversible, with a possible likelihood. Thus, the magnitude of impact is considered as Moderate.

**Table 10-32 Unmitigated Significance of Introduced Species**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Nationally Important Flora	Medium	Moderate	<b>Moderate</b>
Other Flora	Low	Moderate	<b>Minor</b>

However, the following mitigation measures will be implemented to minimise the magnitude of these potential impacts:

- Soil imports will be taken from local quarry or borrow pit as close to the site as reasonably practical to avoid risk of foreign seeds and invasive species;
- Soil imports from outside of the area will undergo checks to prevent accidental introduction of exotic species / pathogens
- Plant and machinery will require an HSE certificate of inspection, issued by the EPC, before coming onto site and this will include necessary cleaning / washing to reduce risks of importing invasive species in mud taken from urban sites.
- These measures shall be captured in the CESMP and shall be implemented and monitored.



These measures reduce the likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-33 Residual Significance of Introduced Species**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Nationally Important Flora	Medium	Minor	Minor
Other Flora	Low	Minor	Negligible

### 10.5.1.5 Environmental Quality

#### AIR

Dust can coat vegetation, reducing photosynthesis and respiration ability, causing desiccation. Emissions of pollutants such as NO<sub>x</sub>, SO<sub>x</sub>, PM and CO can lower survivorship and increase susceptibility of affected wildlife to disease.

This direct impact has low intensity, with a spatial extent of the full construction footprint, is temporary and reversible, with a possible likelihood. Thus, the magnitude of impact is considered as Minor.

**Table 10-34 Unmitigated Significance of Fugitive Dust**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Nationally Important Flora	Medium	Minor	Minor
Other Flora	Low	Minor	Negligible

**Table 10-35 Unmitigated Significance of Air Pollution**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Threatened Mammals	High	Minor	Moderate
Nationally Important Mammals	Medium	Minor	Minor
Other Mammals	Low	Minor	Negligible
Threatened Reptiles	High	Minor	Moderate
Nationally Important Reptiles	Medium	Minor	Minor

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Other Reptiles	Low	Minor	Negligible
Endangered Birds	Very High	Minor	Moderate
Threatened Birds	High	Minor	Minor
Nationally Important Birds	Medium	Minor	Minor
Other Birds	Low	Minor	Negligible

However, the following mitigation measures will be implemented to minimise the magnitude of these potential impacts:

- Refer to air quality control measures.
- All tracks will be damped down to reduce risk of dust and this will be checked daily.
- These measures shall be captured in the CESMP and shall be implemented and monitored.

These measures reduce the spatial extent, intensity and likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-36 Residual Significance of Fugitive Dust**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Nationally Important Flora	Medium	Negligible	Negligible
Other Flora	Low	Negligible	Negligible

**Table 10-37 Residual Significance of Air Pollution**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Threatened Mammals	High	Negligible	Minor
Nationally Important Mammals	Medium	Negligible	Negligible
Other Mammals	Low	Negligible	Negligible
Threatened Reptiles	High	Negligible	Minor
Nationally Important Reptiles	Medium	Negligible	Negligible
Other Reptiles	Low	Negligible	Negligible

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Endangered Birds	Very High	Negligible	<b>Minor</b>
Threatened Birds	High	Negligible	<b>Minor</b>
Nationally Important Birds	Medium	Negligible	<b>Negligible</b>
Other Birds	Low	Negligible	<b>Negligible</b>

#### NOISE AND VIBRATION

Construction noise can cause acoustic masking, disturbance and displacement, and general reduction in survivorship and reproductive success in a variety of fauna. Most impacted are acoustic communicators such as bird and bat species.

Vibration can cause disturbance but also result in collapse of underground burrows and tunnels, particularly impacting burrowing mammals and reptiles as well as invertebrates.

This direct impact has moderate-high intensity, with a regional spatial extent, is temporary and reversible, with a certain likelihood. Thus, the magnitude of impact is considered as Minor.

**Table 10-38 Unmitigated Significance of Noise Impacts**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Threatened Mammals	High	Minor	<b>Moderate</b>
Nationally Important Mammals	Medium	Minor	<b>Minor</b>
Other Mammals	Low	Minor	<b>Negligible</b>
Threatened Reptiles	High	Minor	<b>Moderate</b>
Nationally Important Reptiles	Medium	Minor	<b>Minor</b>
Other Reptiles	Low	Minor	<b>Negligible</b>
Endangered Birds	Very High	Minor	<b>Moderate</b>
Threatened Birds	High	Minor	<b>Moderate</b>
Nationally Important Birds	Medium	Minor	<b>Minor</b>
Other Birds	Low	Minor	<b>Negligible</b>

However, the following mitigation measures will be implemented to minimise the magnitude of these potential impacts:

- Refer to noise control measures.

- Minimise noise during sensitive months/ seasons (e.g breeding season) where possible.
- Use of acoustic barriers, dampening, best available technology within construction methodology to reduce noise and vibration as much as possible. Intermittent noise is less desirable than continuous noise as it does not allow for habituation.
- These measures shall be captured in the CESMP and shall be implemented and monitored.

These measures reduce the spatial extent, intensity, duration and likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-39 Residual Significance of Noise Impacts**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Threatened Mammals	High	Negligible	<b>Minor</b>
Nationally Important Mammals	Medium	Negligible	<b>Minor</b>
Other Mammals	Low	Negligible	<b>Negligible</b>
Threatened Reptiles	High	Negligible	<b>Minor</b>
Nationally Important Reptiles	Medium	Negligible	<b>Minor</b>
Other Reptiles	Low	Negligible	<b>Negligible</b>
Endangered Birds	Very High	Negligible	<b>Minor</b>
Threatened Birds	High	Negligible	<b>Minor</b>
Nationally Important Birds	Medium	Negligible	<b>Minor</b>
Other Birds	Low	Negligible	<b>Negligible</b>

#### **LIGHT POLLUTION**

Night-time lighting can impact nocturnal wildlife behaviour. It can act as an attractant, which can cause congregation and higher predation rates / change movement and migration behaviour; act as a repellent which causes displacement; or interfere with the circadian cycle and cause lower survivorship and reproductive success. However, lighting will be required only at specific work areas and not across the wider area or along access roads, thereby limiting lighting to relatively small areas, where night work is required. This direct impact has moderate intensity, with a spatial extent of the full construction footprint, is long-term and reversible, with a probable likelihood. Thus, the magnitude of impact is considered as Minor.

**Table 10-40 Unmitigated Significance of Light Pollution**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Threatened Mammals	High	Minor	<b>Moderate</b>
Nationally Important Mammals	Medium	Minor	<b>Minor</b>
Other Mammals	Low	Minor	<b>Negligible</b>
Threatened Reptiles	High	Minor	<b>Moderate</b>
Nationally Important Reptiles	Medium	Minor	<b>Minor</b>
Other Reptiles	Low	Minor	<b>Negligible</b>
Endangered Birds	Very High	Minor	<b>Moderate</b>
Threatened Birds	High	Minor	<b>Moderate</b>
Nationally Important Birds	Medium	Minor	<b>Minor</b>
Other Birds	Low	Minor	<b>Negligible</b>

However, the following mitigation measures will be in place, to minimise the magnitude of potential impact:

- Ensure lighting is fit for purpose and duration of lighting to be controlled and minimized as much as possible.
- Lights will be shielded to prevent skyglow, spill and glare.
- These measures shall be captured in the CESMP and shall be implemented and monitored.

These measures reduce the spatial extent, intensity and likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-41 Residual Significance of Light Pollution**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Threatened Mammals	High	Negligible	<b>Minor</b>
Nationally Important Mammals	Medium	Negligible	<b>Minor</b>
Other Mammals	Low	Negligible	<b>Negligible</b>
Threatened Reptiles	High	Negligible	<b>Minor</b>
Nationally Important Reptiles	Medium	Negligible	<b>Minor</b>
Other Reptiles	Low	Negligible	<b>Negligible</b>

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Endangered Birds	Very High	Negligible	<b>Minor</b>
Threatened Birds	High	Negligible	<b>Minor</b>
Nationally Important Birds	Medium	Negligible	<b>Minor</b>
Other Birds	Low	Negligible	<b>Negligible</b>

#### CONTAMINATION

Fuels and solvents will be used during construction activities and maintenance. Improper use, storage and handling can result in chemical spills and contamination of the soil and groundwater. Flora and fauna that come into contact may become ill or die. This direct impact has high intensity, with a spatial extent of the full construction footprint, is long-term and irreversible, although unlikely. Thus, the magnitude of unmitigated impact is considered as Minor.

**Table 10-42 Unmitigated Significance of Contamination**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Threatened Mammals	High	Minor	<b>Minor</b>
Nationally Important Mammals	Medium	Minor	<b>Minor</b>
Other Mammals	Low	Minor	<b>Negligible</b>
Threatened Reptiles	High	Minor	<b>Minor</b>
Nationally Important Reptiles	Medium	Minor	<b>Minor</b>
Other Reptiles	Low	Minor	<b>Negligible</b>
Endangered Birds	Very High	Minor	<b>Moderate</b>
Threatened Birds	High	Minor	<b>Minor</b>
Nationally Important Birds	Medium	Minor	<b>Minor</b>
Other Birds	Low	Minor	<b>Negligible</b>

However, the following mitigation measures will be in place, to minimise the magnitude of potential impact:

- Refer to hazardous materials control measures, emergency action plan and spill prevention and clean up measures.



- These measures shall be captured in the CESMP and shall be implemented and monitored.

These measures reduce the likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-43 Residual Significance of Contamination**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Threatened Mammals	High	Negligible	Minor
Nationally Important Mammals	Medium	Negligible	Negligible
Other Mammals	Low	Negligible	Negligible
Threatened Reptiles	High	Negligible	Minor
Nationally Important Reptiles	Medium	Negligible	Negligible
Other Reptiles	Low	Negligible	Negligible
Endangered Birds	Very High	Negligible	Minor
Threatened Birds	High	Negligible	Minor
Nationally Important Birds	Medium	Negligible	Negligible
Other Birds	Low	Negligible	Negligible

#### SOILS

During construction earthworks and vehicle movement, soils may become compacted, which prohibits vegetation regrowth and use for burrowing. Further, removal of vegetation may cause an increase in wind-driven soil erosion, leading to loss of native soils.

This direct impact has low intensity, with a spatial extent of the full construction footprint, is long-term and reversible, with a possible likelihood. Thus, the magnitude of impact is considered as Moderate.

**Table 10-44 Unmitigated Significance of Soil Impacts**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Nationally Important Flora	Medium	Moderate	Moderate
Other Flora	Low	Moderate	Minor
Other Mammals	Low	Moderate	Minor
Threatened Reptiles	High	Moderate	Moderate

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Nationally Important Reptiles	Medium	Moderate	<b>Moderate</b>
Other Reptiles	Low	Moderate	<b>Minor</b>

However, the following mitigation measures **will be in place**, to minimise the magnitude of potential impact:

- Minimise construction footprint and strict controls to prevent driving out of designated corridors
- Habitat restoration post-construction inclusive of topsoil replacement if beneficial or soil filling where deemed necessary to promote regrowth

There will be post-construction restoration of all affected areas to natural habitat conditions. The exact scope and methodology will be detailed in a Habitat Restoration Plan.

These measures reduce the spatial extent, intensity and likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-45 Residual Significance of Soil Impacts**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Nationally Important Flora	Medium	Minor	<b>Minor</b>
Other Flora	Low	Minor	<b>Negligible</b>
Other Mammals	Low	Minor	<b>Negligible</b>
Threatened Reptiles	High	Minor	<b>Minor</b>
Nationally Important Reptiles	Medium	Minor	<b>Minor</b>
Other Reptiles	Low	Minor	<b>Negligible</b>

## 10.5.2 Operation Phase

### 10.5.2.1 Ecosystem Function

#### HABITAT FRAGMENTATION

Development and operation of large-scale and linear alignment projects will fragment the landscape's existing habitats, reducing overall ecosystem connectivity and function. This in turn reduces the ability for vegetation recruitment and wildlife movement between habitat patches. Species with large home range requirements and migratory species in particular may be affected by fragmented habitat. Long-term fragmentation caused by physical barriers may also lead to a reduction in genetic exchange which is a concern for r-selected species with rapid generation turnover.

The Project will not be fenced; therefore, there will be no physical barriers to movement. However, turbines may deter avifauna who exhibit macro-scale avoidance behaviour, such as waterbirds; longer migratory movements can increase stress and lower survivorship of migrants that expend more energy to navigate around wind farms.

Migratory raptors do not exhibit macro-avoidance behaviour; (in fact, this is the reason that migratory raptors are at high risk for turbine collision); thus habitat fragmentation from the presence of migratory movement barriers is not considered to apply to raptors.

The Project site does not represent a migratory corridor bottleneck for waterbirds as evidenced by survey results. Other species known and/or anticipated to occur are not thought to be likely barred from movement throughout the habitat patch by the operation of the Project. Therefore, the magnitude of the potential habitat fragmentation impact has been determined to be Negligible.

### 10.5.2.2 Biodiversity Loss

#### TURBINE COLLISION – BIRDS

Wind Farms pose a unique threat to birds due to the potential for collision with moving turbines. It has been well documented at existing wind farm developments that turbine collisions result in mortality of birds. However, the magnitude of risk and significance of the potential impact is highly dependent upon the location of the wind farm and landscape context, spatial layout, height and length of turbines, and the types and numbers of birds present. In order to assess the potential impacts, separate assessments are undertaken which are species-specific, location specific and season specific.

- Generally, larger soaring birds and 'poor fliers' with high wing-loading are thought to be at higher risk.
- Migratory individuals are at higher risk than residents.
- Raptors have restricted forward field of view that may reduce visibility of turbines and avoidance ability.
- Research indicates that many migratory birds, particularly waterfowl, potentially avoid wind farms at macro scales.

A quantitative assessment was undertaken by utilising a Collision Risk Model (CRM) developed as per SNH Guidelines, using Band et al. predictive modelling. Refer to Volume 4 for the full CRM report. Section 2.3 of the CRM includes the methodology for deriving bird density values from the VP survey data.

It is important to note that avoidance rates are predicted and have a large weight on the final collision risk predictions. Further, avoidance behaviour is not only species-specific but may also be influenced by (1) turbine locations and (2) weather conditions (visibility / flight ability). Therefore, even low predicted collision rates do not exclude the need for adaptive mitigation approaches (detailed subsequently).

The CRM for the species of concern is presented in the following table.

**Table 10-46 Estimated Rates of Collisions per Year for Bird Species**

COMMON NAME	USING CONSERVATIVE CA VALUE		USING MOST REALISTIC CA VALUE	
	COLLISIONS/YEAR	YEARS TO 1 COLLISION	COLLISIONS/YEAR	YEARS TO 1 COLLISION
<b>Target Species</b>				
Steppe Eagle	0.0220	45	0.00485	206
Golden Eagle	0.0181	55	0.00401	249
Red- footed Falcon	0.144	6	0.0351	28
<b>Secondary Species</b>				
Eurasian Marsh Harrier	1	1	0.242	4
Hen Harrier	0.542	1	0.108	9
Common Buzzard	0.145	6	0.0330	30
Long-legged Buzzard	0.829	1	0.188	5
Rough- legged Hawk	0.322	3	0.0733	13
Common Crane	3.72	<1	0.223	4
Eurasian Kestrel	23	<1	5	<1

The magnitude of impact has been determined on a species-specific basis based on the results of the CRM.

**Table 10-47 Magnitude of Predicted Turbine Collision Impact – Birds**

SPECIES	JUSTIFICATION	IMPACT MAGNITUDE
Steppe Eagle	The predicted collision risk is so low that no individuals are anticipated to be lost.	No change
Golden Eagle	The predicted collision risk is so low that no individuals are anticipated to be lost.	No change
Red- footed Falcon	The predicted collision risk is so low that only a single individual is anticipated to be lost.	Negligible
Eurasian Marsh Harrier	Only a total of 8 individuals are predicted to collide throughout the entirety of the project lifetime. Given the robust population size globally, this is not considered to be of any concern on the population level.	Minor
Hen Harrier	Only a total of 3--4 individuals are predicted to collide throughout the entirety of the project lifetime. Given the robust population size globally, this is not considered to be of any concern on the population level.	Minor
Common Buzzard	The predicted collision risk is so low that no individuals are anticipated to be lost.	Negligible
Long-legged Buzzard	Only a total of 6 individuals maximum are predicted to collide throughout the entirety of the project lifetime. Given the robust population size globally, this is not considered to be of any concern on the population level.	Minor
Rough- legged Hawk	Only a total of 2-3 individuals are predicted to collide throughout the entirety of the project lifetime. Given the robust population size globally, this is not considered to be of any concern on the population level.	Minor
Common Crane	Only a total of 8 individuals are predicted to collide throughout the entirety of the project lifetime. Given the robust population size globally, this is not considered to be of any concern on the population level.	Minor
Eurasian Kestrel	This species is extremely common; the global population comprises of 4-6 million birds. It is not considered that the loss of 5 individuals per year will have an impact on the regional population.	Moderate

The significance of collision impacts for birds is shown in the following table.

**Table 10-48 Unmitigated Significance of Turbine Collision – Birds**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Steppe Eagle	Very High	No change	Neutral

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Golden Eagle	Medium	No change	Neutral
Red-footed Falcon	Medium	Negligible	Minor
Eurasian Marsh-harrier	Low	Minor	Negligible
Hen Harrier	Low	Minor	Negligible
Common Buzzard	Low	Negligible	Negligible
Long-legged Buzzard	Low	Minor	Negligible
Rough-legged Hawk	Low	Minor	Negligible
Common Crane	Low	Minor	Negligible
Eurasian Kestrel	Low	Moderate	Minor

The following mitigation measures will be implemented to further reduce collision risk:

- Planned infrastructure within the wind farm shall not include elements attractive for birds, such as lattice towers that provide perching possibilities
- Collision Risk Management Plan will be formulated which includes the following:
  - Acceptable Mortality Thresholds for all priority species, which are calculated on the basis of Potential Biological Removal;
  - 3 years of Fatality Monitoring, which includes carcass searches, searcher bias trials, and persistence trials, and correction factors to be applied for estimating fatalities;
  - Adaptive management program which indicates how anti-collision mitigation shall be applied and upscaled in the event that fatality monitoring indicates that mortality thresholds are being exceeded.

Upfront curtailment in the form of shutdown is not required in light of the low predicted collision rates.

These measures reduce the intensity and likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-49 Residual Significance of Turbine Collision – Birds**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Steppe Eagle	Very High	No change	Neutral
Golden Eagle	Medium	No change	Neutral
Red-footed Falcon	Medium	No change	Neutral
Eurasian Marsh-harrier	Low	No change	Neutral



RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Hen Harrier	Low	No change	Neutral
Common Buzzard	Low	No change	Neutral
Long-legged Buzzard	Low	No change	Neutral
Rough-legged Hawk	Low	No change	Neutral
Common Crane	Low	No change	Neutral
Eurasian Kestrel	Low	No change	Neutral

#### **TURBINE COLLISION – BATS**

Bat fatalities from wind turbine collisions are documented world-wide. However, the driving impetus behind this (when considering that bats rarely collide with other man-made structures) is still unknown and being researched. The patterns that have been observed thus far include:

- Migratory bats making long-distance movements are at higher risk of collision than resident “sedentary” bats. Additionally, migratory bats often have higher tolerance for high wind speeds, further increasing risk.
- “Tree” bats, those that roost in trees, are at higher risk of collision fatalities.
- The majority of fatalities occur during late summer and autumn, which coincides with breeding, increased foraging, and migration.
- Collision Risk is higher for species adapted for foraging insects in open spaces.
- Wind turbines may be acting as an attractant to specific bat species. A recent study undertaken in England found that *P. pipistrellus* activity was 37% higher at turbines than at control locations, whereas *P. pygmaeus* activity was consistent with no attraction or repulsion by turbines. This may be due to the attraction of aerial insects to lights and heat associated with turbines.
- Fatalities increase at low wind speeds, and before and after the passage of storm fronts.
- Mortality increases with turbine tower height and rotor diameter.
- Barotrauma does not appear to be a significant contributing factor to mortality.
- Sensitivity to wind turbine collision is strongly influenced by preferred flight altitudes. The rotor swept area altitude for the Project is 35 m to 205 m.

The magnitude of impact has been determined on a species-specific basis based on the results of baseline and known species-specific interactions.

**Table 10-50 Magnitude of Predicted Turbine Collision Impact – Bats**

SPECIES	FLIGHT ALTITUDE	JUSTIFICATION	IMPACT MAGNITUDE
<i>Eptesicus bottae</i>	25 – 50 m	Within risk zone of rotor-swept area	Moderate
<i>Eptesicus serotinus</i>	10 – 30 m	Just outside risk zone of rotor swept area	Minor
<i>Pipistrellus pipistrellus</i>	25 – 50 m	Within risk zone of rotor-swept area	Moderate

The magnitude and unmitigated significance calculations are presented in the table below.

**Table 10-51 Unmitigated Significance of Turbine Collision (Bats)**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
<i>Eptesicus bottae</i>	Low	Moderate	<b>Minor</b>
<i>Eptesicus serotinus</i>	Low	Minor	<b>Minor</b>
<i>Pipistrellus pipistrellus</i>	Low	Moderate	<b>Minor</b>

The following mitigation measures will be implemented to reduce collision risk:

- Prevention of elements that may attract bats, or insects and therefore bats:
  - All WTGs, particularly the nacelles, will be designed, constructed and maintained in such a manner that they minimise the support for roosting bats (to the extent possible as per wind turbine design);
  - Use lighting only as needed and use wavelengths and designs that do not attract insects or bats;
  - Bright white or bluish lights (mercury vapor, white incandescent and white florescent) are the most attractive to insects. Yellowish, pinkish, or orange (sodium vapor, halogen, dichroic yellow) are the least attractive to most insects. LED bulbs are less attractive because they produce low heat and long wavelengths of light as well as little or no ultraviolet radiation.
  - Prevent retention of water and growth of weeds/shrub as well as hedges and shrubs that may attract insects in the immediate vicinity.
- A Collision Risk Management Plan will be formulated which includes the following:
  - Acceptable Mortality Thresholds for all priority species, which are calculated on the basis of Potential Biological Removal;
  - 3 years of Fatality Monitoring, which includes carcass searches, searcher bias trials, and persistence trials, and correction factors to be applied for estimating fatalities;
  - Acoustic monitoring to understand how species composition and bat activity indices relate to meteorological conditions. On the one met mast (to be installed) two detectors will be installed at differing heights and detectors

will be placed at approximately 2 m ABGL on two of the turbines. Further details will be provided in the Collision Risk Management Plan; and

- Adaptive management program which indicates how anti-collision mitigation shall be applied and upscaled in the event that fatality monitoring indicates that mortality thresholds are being exceeded. An example of mitigation should the mortality thresholds be exceeded is the potential use of cut-in curtailment during times when acoustic monitoring shows higher levels, which can be seasonal, specific timings, or correlated to specific wind speeds and meteorological conditions.

These measures reduce the intensity and likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-52 Residual Significance of Turbine Collision (Bats)**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
<i>Eptesicus bottae</i>	Low	Minor	Negligible
<i>Eptesicus serotinus</i>	Low	Negligible	Negligible
<i>Pipistrellus pipistrellus</i>	Low	Minor	Negligible

#### OHTL COLLISIONS - BIRDS

Thin, dark wires used in overhead transmission lines are visually difficult to detect. Bird mortality by collisions with these wires have been documented for a variety of species.

In the case of power lines, the bird collides with one of the wires, generally the earth wire, which is less visible. Particularly at risk are birds migrating between 20 – 50 m altitude, birds flying at night, birds flying in flocks, and / or large and heavy birds of limited manoeuvrability.

The magnitude of impact has been determined on a species-specific basis based on the prevalence of the species in the area combined with collision risk (which takes into account body size, manoeuvrability, vision, flight timing and behaviour).

**Table 10-53 Magnitude of Predicted OHTL Collision Impact – Birds**

SPECIES	IMPACT MAGNITUDE
Egyptian Vulture	Minor
Steppe Eagle	Moderate
Imperial Eagle	Minor
Red-footed Falcon	Minor

SPECIES	IMPACT MAGNITUDE
Golden Eagle	Moderate
European Turtle-Dove	Minor
Eurasian Marsh-harrier	Minor
Hen Harrier	Minor
Rough-legged Hawk	Minor
Common Buzzard	Minor
Long-legged Buzzard	Minor
Eurasian Kestrel	Minor
Common Crane	Major
Black-bellied Sandgrouse	Moderate
Egyptian Nightjar	Moderate
Little Owl	Minor

The following table outlines the unmitigated significance for OHTL Collision – Birds.

**Table 10-54 Unmitigated Significance of OHTL Collision – Birds**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Egyptian Vulture	Very High	Minor	<b>Major</b>
Steppe Eagle	Very High	Moderate	<b>Major</b>
Imperial Eagle	High	Minor	<b>Moderate</b>
Red-footed Falcon	High	Minor	<b>Moderate</b>
Golden Eagle	Medium	Moderate	<b>Moderate</b>
European Turtle-Dove	Medium	Minor	<b>Minor</b>
Eurasian Marsh-harrier	Low	Minor	<b>Negligible</b>
Hen Harrier	Low	Minor	<b>Negligible</b>

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Rough-legged Hawk	Low	Minor	<b>Negligible</b>
Common Buzzard	Low	Minor	<b>Negligible</b>
Long-legged Buzzard	Low	Minor	<b>Negligible</b>
Eurasian Kestrel	Low	Minor	<b>Negligible</b>
Common Crane	Low	Major	<b>Moderate</b>
Black-bellied Sandgrouse	Low	Moderate	<b>Minor</b>
Egyptian Nightjar	Low	Moderate	<b>Minor</b>
Little Owl	Low	Minor	<b>Negligible</b>

The following mitigation measures will be implemented to further reduce collision risk:

- Removing the thin neutral or earth (shield) wire above the high voltage transmission lines where feasible, and where this is not possible, marking the line to make it more visible;
- Bundling high voltage wires, and using spacers to increase visibility;
- Minimising the vertical spread of power lines. Having lines in a horizontal plane reduces collision risk;
- Using existing infrastructure corridors such as road and railway RoW; existing powerline transmission corridors; and other areas with existing disturbances that deter bird activity.
- Using bird deflectors to increase line visibility by thickening the appearance of the line by a minimum of 20 cm over a length of 10-20cm; or using markers that are moveable, of contrasting colours (e.g. black and white), contrast with the background, protrude above and below the line, and be placed 5-10 m apart. Firefly Diverters are considered to be of robust specification to provide the needed visual deterrence required, as it includes UV-light reflectivity and are visible in low-light and low-visibility conditions.
- Any markers must be robust to allow long-term durability for the environmental conditions of exposure; maintenance plans for the OHTL should include inspections of marker devices and replacements as needed.
- A Collision Risk Management Plan will be formulated which will include the following:
  - Acceptable Mortality Thresholds for all priority species (including the Common Crane), which are to be calculated on the basis of Potential Biological Removal;

- 3 years of Fatality Monitoring, which includes carcass searches, searcher bias trials, and persistence trials, and correction factors to be applied for estimating fatalities;
- Adaptive management program which indicates how anti-collision mitigation shall be applied and upscaled in the event that fatality monitoring indicates that mortality thresholds are being exceeded.

These measures reduce the intensity and likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-55 Residual Significance of OHTL Collision – Birds**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Egyptian Vulture	Very High	Negligible	Minor
Steppe Eagle	Very High	Negligible	Minor
Imperial Eagle	High	Negligible	Minor
Red-footed Falcon	High	Negligible	Minor
Golden Eagle	Medium	Negligible	Negligible
European Turtle-Dove	Medium	Negligible	Negligible
Eurasian Marsh-harrier	Low	Negligible	Negligible
Hen Harrier	Low	Negligible	Negligible
Rough-legged Hawk	Low	Negligible	Negligible
Common Buzzard	Low	Negligible	Negligible
Long-legged Buzzard	Low	Negligible	Negligible
Eurasian Kestrel	Low	Negligible	Negligible
Common Crane	Low	Negligible	Negligible
Black-bellied Sandgrouse	Low	Negligible	Negligible
Egyptian Nightjar	Low	Negligible	Negligible
Little Owl	Low	Negligible	Negligible

#### **OHTL ELECTROCUTION – BIRDS**

Power transmission lines present potential electrocution risk to birds. In particular, larger-bodied birds which tend to prefer perching at high altitudes such as raptors, including eagles and vultures, have the highest risk for electrocution, as larger wingspans create the opportunity for



span the distance between energised and ground components of power lines. Further compounding the impact is the fact that many of these species are K-selected with low reproductive rates, so additive mortality is of significance. For many endangered species worldwide, electrocution by powerlines is considered to be the number one conservation threat contributing to population decline.

The magnitude of impact has been determined on a species-specific basis based on the prevalence of the species in the area combined with electrocution risk.

**Table 10-56 Unmitigated Significance of OHTL Electrocution – Birds**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Egyptian Vulture	Very High	Major	Major
Steppe Eagle	Very High	Major	Major
Imperial Eagle	High	Major	Major
Red-footed Falcon	High	Moderate	Moderate
Golden Eagle	Medium	Major	Moderate
European Turtle-Dove	Medium	Minor	Minor
Eurasian Marsh-harrier	Low	Major	Minor
Hen Harrier	Low	Major	Minor
Rough-legged Hawk	Low	Major	Minor
Common Buzzard	Low	Major	Minor
Long-legged Buzzard	Low	Major	Minor
Eurasian Kestrel	Low	Moderate	Minor
Common Crane	Low	Minor	Negligible
Black-bellied Sandgrouse	Low	Minor	Negligible
Egyptian Nightjar	Low	Minor	Negligible
Little Owl	Low	Minor	Negligible

The following mitigation measures will be implemented to further reduce electrocution risk:

- Ensure a safe design of the cross arm and related equipment (separate energised conductors and grounded hardware distances by more than largest species wingspan)

- Use suspended insulators and avoid pin and dead-end/strain insulators
- Ensure safe distance (minimum 2 m) between suspended conductor/jumper wire and lower branch in the cross arm.
- In the configurations with high electrocution risk (derivations, tap, transformer and switch poles and its connected grounded wires and jumpers) all grounded elements should be insulated, and grounded wires and jumpers should be sheathed wires.
- Design will be as per recommendations provided in Reference Note: Quick Guidance for Preventing Electrocution Impacts on Birds, Initiated by International Association for Falconry and Conservation of Birds of Prey.
- Provide safe perching and nesting opportunities via the erection of perching poles and/or nesting platforms or boxes; they should be the highest elements of the structure to attract birds away from perching on potentially dangerous components.
- A Collision Risk Management Plan will be formulated which includes the following:
  - Acceptable Mortality Thresholds for all priority species, which are calculated on the basis of Potential Biological Removal;
  - 3 years of Fatality Monitoring, which includes carcass searches, searcher bias trials, and persistence trials, and correction factors to be applied for estimating fatalities;
  - Adaptive management program which indicates how anti-collision mitigation shall be applied and upscaled in the event that fatality monitoring indicates that mortality thresholds are being exceeded.

These measures significantly reduce the intensity and likelihood of the impact occurring and thus the magnitude of impact is reduced accordingly.

**Table 10-57 Residual Significance of OHTL Electrocution (Birds)**

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Egyptian Vulture	Very High	Negligible	Minor
Steppe Eagle	Very High	Negligible	Minor
Imperial Eagle	High	Negligible	Minor
Red-footed Falcon	High	Negligible	Minor
Golden Eagle	Medium	Negligible	Negligible
European Turtle-Dove	Medium	Negligible	Negligible
Eurasian Marsh-harrier	Low	Negligible	Negligible

RECEPTOR	SENSITIVITY	REDUCED MAGNITUDE	RESIDUAL SIGNIFICANCE
Hen Harrier	Low	Negligible	<b>Negligible</b>
Rough-legged Hawk	Low	Negligible	<b>Negligible</b>
Common Buzzard	Low	Negligible	<b>Negligible</b>
Long-legged Buzzard	Low	Negligible	<b>Negligible</b>
Eurasian Kestrel	Low	Negligible	<b>Negligible</b>
Common Crane	Low	Negligible	<b>Negligible</b>
Black-bellied Sandgrouse	Low	Negligible	<b>Negligible</b>
Egyptian Nightjar	Low	Negligible	<b>Negligible</b>
Little Owl	Low	Negligible	<b>Negligible</b>

#### DISTURBANCE

The presence of anthropogenic activity is disturbing to many sensitive species, which can result in reduced survivorship, reproductive success, and ultimately, population decline.

Disturbance especially impacts the reproductive success of breeding birds, which may abandon breeding attempts, or desert nests or colonies if disturbance levels are unacceptable. Although no evidence of nesting was found during the breeding bird surveys conducted, there remains the possibility that nesting could occur.

Other species that may be displaced due to disturbance include particularly sensitive such as the shy Houbara Bustard, although most wildlife which is not already habituated to anthropogenic disturbance is anticipated to be negatively affected.

This direct impact has low intensity, with a spatial extent of the full construction footprint and a 1 km buffer, is long-term and reversible, with a possible likelihood. Thus, the magnitude of impact is considered as Minor.

**Table 10-58 Unmitigated Significance of Disturbance**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Threatened Mammals	High	Minor	<b>Moderate</b>
Nationally Important Mammals	Medium	Minor	<b>Minor</b>

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Other Mammals	Low	Minor	Negligible
Threatened Reptiles	High	Minor	Moderate
Nationally Important Reptiles	Medium	Minor	Minor
Other Reptiles	Low	Minor	Negligible
Endangered Birds	Very High	Minor	Moderate
Threatened Birds	High	Minor	Moderate
Nationally Important Birds	Medium	Minor	Minor
Other Birds	Low	Minor	Negligible

### 10.5.2.3 Biodiversity Displacement

#### DISPERSAL

Shyer species may be displaced away from the project area as a result of operational disturbance, having indirect secondary impacts on adjacent territories via increased competition for resources compromising population stability, causing ecosystem imbalances. However, due to the nature of the Project and the fact it will not be fenced, the magnitude of operational disturbance is expected to be negligible.

**Table 10-59 Unmitigated Significance of Displacement**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Goitered Gazelle	High	Negligible	Minor
Turkmen Caracal, Corsac Fox, Bukhara Red Deer	Medium	Negligible	Negligible
Wild Cat, Red Fox	Low	Negligible	Negligible
Tolai Hare, Yellow Ground Squirrel, Gerbils and Jerboas, Mole Vole, Hedgehog	Low	Negligible	Negligible
Russian Tortoise	High	Negligible	Minor
Sand Boa	Medium	Negligible	Negligible

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Other Reptiles	Low	Negligible	<b>Negligible</b>
Egyptian Vulture	Very High	Negligible	<b>Minor</b>
Houbara Bustard, Turtle-dove	High	Negligible	<b>Minor</b>
Other Birds	Low	Negligible	<b>Negligible</b>

#### 10.5.2.4 Environmental Quality

##### NOISE AND VIBRATION

Operational noise created by the operation of WTGs can cause acoustic masking, disturbance and displacement, and general reduction in survivorship and reproductive success in a variety of fauna. Most impacted are typically acoustic communicators such as bird and bat species. Vibration can cause elevated stress response in reptiles and could potentially cause collapse of burrows.

The noise level are anticipated to be between 34.3 – 44.6 dB within the Wind Farm site boundary, depending on wind speed (5 m/s to 10 m/s). Although wildlife has been studied to exhibit deterrence behaviour at levels of dB 40 (in particular next to roads), the existing windy conditions at the site already regularly incur sound levels of 40+ dB. Therefore, as the introduced noise will be related to wind speed and changes will be gradual (not sudden/intermittent) it is likely that fauna will be able to habituate to the additional sound. Therefore, the magnitude of impact has been determined to be Negligible.

**Table 10-60 Unmitigated Significance of Noise Impacts**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Threatened Mammals	High	Negligible	<b>Minor</b>
Nationally Important Mammals	Medium	Negligible	<b>Negligible</b>
Other Mammals	Low	Negligible	<b>Negligible</b>
Threatened Reptiles	High	Negligible	<b>Minor</b>
Nationally Important Reptiles	Medium	Negligible	<b>Negligible</b>
Other Reptiles	Low	Negligible	<b>Negligible</b>
Endangered Birds	Very High	Negligible	<b>Minor</b>

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Threatened Birds	High	Negligible	Minor
Nationally Important Birds	Medium	Negligible	Negligible
Other Birds	Low	Negligible	Negligible

#### LIGHT POLLUTION

Night-time lighting can impact nocturnal wildlife behaviour. It can act as an attractant, which can cause congregation and higher predation rates / change movement and migration behaviour; act as a repellent which causes displacement; or interfere with the circadian cycle and cause lower survivorship and reproductive success.

However, the only lights that will be used during operation are a motion-automated light at the location of the sub-station, and airplane safety warning lights at the hubs of the turbines.

This direct impact has low intensity, with a spatial extent of the full construction footprint, is long-term and reversible, with a possible likelihood. Thus, the magnitude of impact is considered as Negligible.

**Table 10-61 Unmitigated Significance of Lighting Impacts**

RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	UNMITIGATED SIGNIFICANCE
Threatened Mammals	High	Negligible	Minor
Nationally Important Mammals	Medium	Negligible	Negligible
Other Mammals	Low	Negligible	Negligible
Threatened Reptiles	High	Negligible	Minor
Nationally Important Reptiles	Medium	Negligible	Negligible
Other Reptiles	Low	Negligible	Negligible
Endangered Birds	Very High	Negligible	Minor
Threatened Birds	High	Negligible	Minor
Nationally Important Birds	Medium	Negligible	Negligible
Other Birds	Low	Negligible	Negligible





## 10.6 Management and Monitoring

The mitigation measures applied to reduce significant impacts will require a number of management plans to detail the implementation and action items needed, as well as monitoring and reporting requirements to ensure compliance and measure performance.

### DESIGN PHASE

The following outline the mitigation requirements during design phase:

- Integration of design mitigation into lighting design and OHTL specifications, and exclusion of roosting and perching opportunities within WTGs.

### PRE-CONSTRUCTION

The following outline the mitigation requirements pre-construction:

- Implementation of pre-construction surveys
  - Flora for translocation or demarcating
  - Tortoise relocation
- Review of Construction Methodology:
  - Site Clearance and Layout
  - Timing and method of works
  - Lighting Strategy
  - Solid Waste Management Strategy
- Preparation of CESMP, inclusive of:
  - General Site Controls
  - Solid Waste Control Plan
  - Chance Find Procedure
  - Air Quality Control Plan
  - Dust Control Plan
  - Noise Control Plan
  - Lighting Control Plan
  - Hazardous Materials Control Plan
  - Emergency Action Plans
  - Spill Prevention and Clean-up Procedures

### CONSTRUCTION

The following outline the mitigation requirements during construction:

- Implementation of CESMP
  - Daily Checklist
  - Weekly Inspection

- Monthly Reporting
- Quarterly Auditing

#### **POST-CONSTRUCTION**

The following outline the mitigation requirements post-construction:

- Preparation of Habitat Restoration Action Plan
  - Carrying out restoration works
  - Post-restoration survey

#### **OPERATION**

The following outline the mitigation requirements during operation:

- Preparation and Implementation of OESMP, inclusive of:
  - General Site Controls
  - Noise Control Plan
  - Lighting Control Plan
- Collision Risk Management Plan
- Fatality Monitoring Plan

## 11 LANDSCAPE AND VISUAL AMENITY

### 11.1 Applicable Requirements & Standards

#### 11.1.1 National Regulations

There are no regulations or standards in Uzbekistan that provide requirements for assessing landscape character, visual impacts and shadow flicker from wind turbines.

#### 11.1.2 Lender Requirements

The EHS Guidelines for Wind Energy (2015) outline that *'preparing zones of visual influence maps and preparing wire-frame images and photomontages from key viewpoints is recommended to inform both the assessment and the consultation processes.'*

*'Consideration should also be given to the proximity of turbines to settlements, residential areas, and other visual receptors to minimize visual impacts and impacts on residential amenity, where possible. All relevant viewing angles should be considered when considering turbine locations, including viewpoints from nearby settlements.'*

### 11.2 Baseline Conditions, Zone of Theoretical Visibility and Receptors

#### 11.2.1 Study Area

Guidance developed by Scottish Natural Heritage (SNH) (Visual Representation of Windfarms Version 2.2, February 2017) indicates that an area with a radius of 45 km from the nearest WTG is appropriate for WTGs of the size proposed for the Project and therefore a radius of 50 km from the centre of site has been used.

#### 11.2.2 Desktop Survey

Baseline information of the site and 50 km radius study area was initially gathered via a desktop study. This study identified aspects of the landscape and visual resources that were considered in the landscape and visual impact assessment, including:

- topography and landform, land cover, distribution and type of land use;
- development / settlement patterns and scale,
- vegetation;
- transport routes;
- heritage features of local or international importance;

- touristic/recreational destinations; and
- landscape character typology and specific viewpoints.

### 11.2.3 Fieldwork Survey

An initial fieldwork survey was undertaken in December 2021. This included taking a photographic record of the landscape and visual baseline, visiting locations determined through the initial desktop study, as well as travel throughout the study area to consider potential effects on landscape character and on the experience of views seen from routes through the landscape. The landscape was analysed for particular features that contribute to the landscape character of the site and its wider setting

### 11.2.4 Landscape Character Baseline

#### 11.2.4.1 Land Use

The Project land comprises an area of uninhabited and featureless desert with no human influence. Within the 50 km study area the northern section primarily comprises desert, with isolated examples of human activity except for limited herding activity, the Karatau hills separate the Project site from pockets of industrial activity, and further south on the other side of the Amu Darya River there is land used for agriculture.

#### 11.2.4.2 Settlements

There are no settlements within the Project site, however, there are two shelters that are used as residences by one herding family located within 5 km of the site boundary for the WTGs and adjacent to the proposed access road. One shelter used for guarding the meteorological mast is located approximately 3.8 km from the boundary for the WTGs.

The nearest permanent communities include Oltinsoy, Taldyk and Karatau, which are all located >10 km from the site boundary for the WTGs.

#### 11.2.4.3 Landform and Topography

The site terrain within the boundary of the land allocated for the WTGs is moderately undulating, with elevations ranging between 250 m and 345 m above Vertical Reference Datum (Baltic Height System 1977).

The site is bounded to the south and west by the Karatau hills which reach altitudes of approximately 460 m. The hills are the only topographical feature of interest within the study area with the majority comprising a featureless landscape.

#### **11.2.4.4 Vegetation**

Vegetation is typically limited to low, desert shrub vegetation. No trees were observed in the study area.

#### **11.2.4.5 Access**

The closest primary road is the A380 that runs in a northwest/south-east direction west of the Project site that connects the cities of Nukus and Bukhara. The roadway along the section that runs parallel to the Project site is in poor condition with numerous potholes and cut-outs. The road will require substantial rehabilitation and maintenance. The road is also frequently used by HGVs passing to and from the industrial facilities in the area.

The site will be connected to main roads by an access road which currently consists of a sand track.

#### **11.2.4.6 Heritage and Culture**

There is nothing of known cultural or historic significance recorded or identified within the Project site, however, Chilpak Kala (C-1; located approximately 40 km from the Project) and the Sultan Uwais Baba Complex (C-2; located approximately 10 km from the Project) are located within the wider study area.

A key task of the landscape and visual impact assessment was to determine if the Project would be visible from these two locations.

#### **11.2.4.7 Recreation**

There are no known recreational sites in the surrounding area.

### **11.2.5 Landscape Character Areas**

Through a combination of desktop review and site visits, the study area has been classified into three units of broadly homogenous characteristics referred to as landscape character areas (LCAs). The three LCAs are described in further detail below and shown in the following figure.

The landscape receptors were selected following guidance within the 'Guidelines for Landscape and Visual Impact Assessment' (2013).

#### **11.2.5.1 LCA 1 – Desert**

- This LCA is gently undulating but has no features of topographical interest.
- It is generally sandy / dusty with low desert shrub vegetation.



- There are no settlements besides the three shelters used by one herder and there is a resultant sense of isolation.
- The A380 passes through this LCA and there are frequent HGV travelling on this road.
- Pockets of anthropogenic activity exist close to the A380 such as a fuel station.

An indicative figure of LCA 1 is shown in the following image.



**Figure 11-1 Indicative Image of LCA 1 - Desert**

#### **SUSCEPTIBILITY TO CHANGE**

It is a relatively featureless desert landscape marked only by the presence of pockets of anthropogenic disturbance (e.g., the A380 and the herder's shelters), but these are isolated sites within the much broader, large-scale landscape. The Project would therefore share a degree of consistency with the existing pattern and land use of the prevailing character. It is a landscape of medium susceptibility in this context.

#### **VALUE**

The area lacks any recognised features of local or national value and has few distinctive characteristics. The busy road is a notable detracting feature. It is considered to be of low value.

#### **SENSITIVITY**

LCA is considered to have a low sensitivity.

### 11.2.5.2 LCA 2 – Karatau Hills

The hills are a topographical feature of interest in contrast to the surrounding desert. Due to the flat surroundings, it is possible to see the Karatau hills from some distance.

The hills are unsettled and undisturbed area, however, there are pockets of industrial activity at the foot of the hills. An example of LCA 2 is shown in the following figure.



**Figure 11-2 Indicative Image of LCA 2 - Karatau Hills (in background)**

#### **SUSCEPTIBILITY TO CHANGE**

This LCA is undisturbed and, due to its relative elevation, would have an unobstructed view of the Project and therefore is a landscape of high susceptibility in this context.

#### **VALUE**

The only feature of note is the topography, and therefore it is considered to be of medium value.

#### **SENSITIVITY**

LCA is considered to have a medium sensitivity.

### 11.2.5.3 LCA 3 – Industrial

LCA 3 is the pockets of industrial activity within the other landscape character areas, the industrial activities relate to cement production and mining facilities. This human activity is apparent against the wider featureless landscape. An example is shown in the following figure.



**Figure 11-3 Indicative Image of LCA 3 - Industrial**

**SUSCEPTIBILITY TO CHANGE**

This landscape character area has significant human disturbance and is considered to be of very low susceptibility to change.

**VALUE**

This LCA has only detracting features and is highly disturbed and is considered to be of very low value.

**SENSITIVITY**

The sensitivity of this LCA is very low.

**11.2.5.4 LCA 4 – Agricultural**

South of the Amu Darya River the land use typically relates to agriculture with minor settlements, from review of satellite imagery the land appears to be well organised with distinct plots.

**SUSCEPTIBILITY TO CHANGE**

Being a largely settled area disturbed by agriculture, it is a landscape capable of tolerating substantial change. It is a landscape of low susceptibility in this context.

**VALUE**

This LCA has only detracting features and is highly disturbed and is considered to be of very low value.

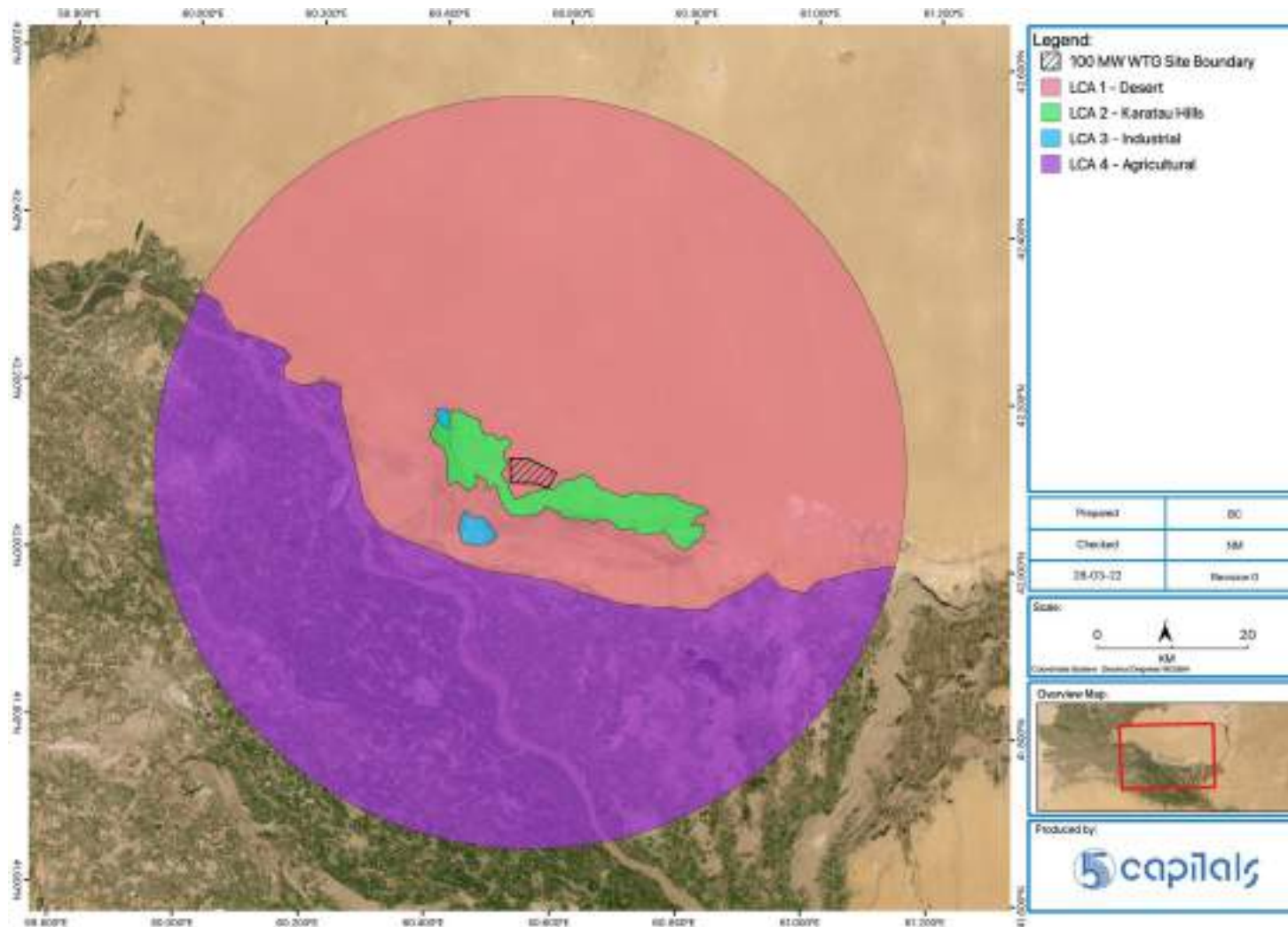
## SENSITIVITY

The area lacks any recognised features of value and has few distinctive characteristics. It is considered to be of low value.

The locations of the LCAs are shown in the following figure.

**Table 11-1 Landscape Receptors**

RECEPTOR	SENSITIVITY
LCA 1 – Desert	Low
LCA 2 – Karatau Hills	Medium
LCA 3 – Industrial	Very Low
LCA 4 - Agricultural	Low



**Figure 11-4 Landscape Character Areas**

## 11.2.6 Visual Amenity Baseline

### 11.2.6.1 Zone of Theoretical Visibility and Receptors

The Zone of Theoretical Visibility (ZTV) represents the area over which a development can theoretically be seen. The ZTV was prepared using the specialist WindFarm software and Shuttle Radar Topography Mission (SRTM) elevation data.

The ZTV presents a 'bare ground' scenario, i.e., the visibility of the Project in a landscape without screening structures such as buildings, ground-surface features or vegetation. The ZTV also does not take into account the effects of weather and atmospheric conditions, and therefore can be said to represent a 'worst-case' scenario, that is where the wind farm could potentially be seen given no intervening obstructions and favourable weather conditions.

The ZTV indicates areas from where a wind farm may be visible, but cannot show how it will look, nor indicate the nature or magnitude of visual impacts. The visibility of the turbines will decrease with the distance from which they are viewed, but this is not accounted for in the ZTV.

As per SNH (2017) recommendation, separate ZTV calculations have been run for the overall height (to blade tip) and for the height of the turbine to its hub (representing the nacelle). SNH state that *"This is a useful comparison that helps to identify areas where turbine blades may be visible, but not the tower. These separate ZTVs will also be helpful for proposals involving turbine lighting, as lights are usually sited on the nacelle."*

The following figures depict the 50 km ZTV of the Project, determined using turbine locations and specifications (i.e., hub-height and rotor diameter). The first figure depicts the 'Hub Height ZTV', the second figure depicts the 'Blade Tip ZTV'. Both figures depict the two cultural receptors within the study area to assess the visibility from these locations.



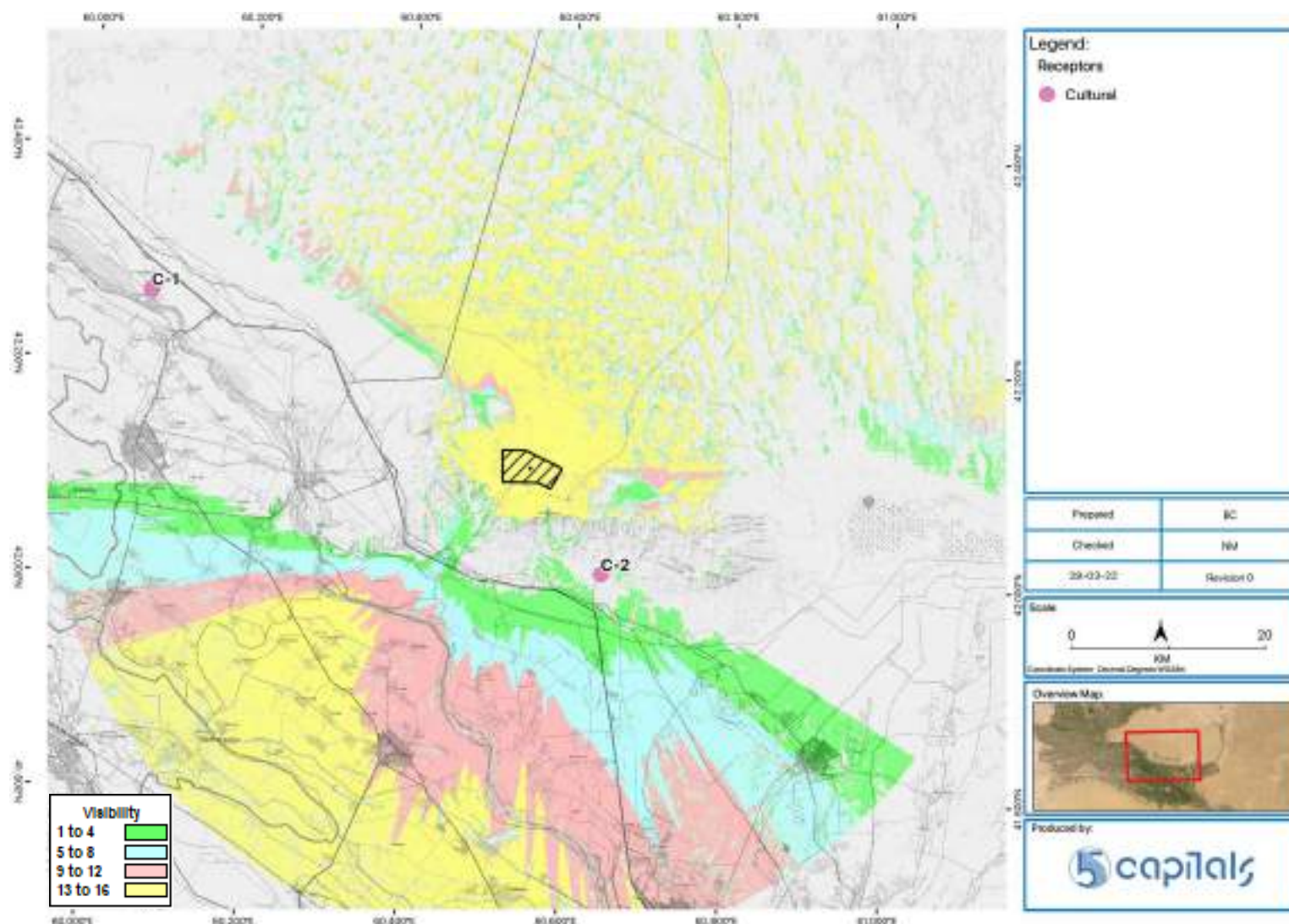


Figure 11-5 Hub Height Zone of Theoretical Visibility

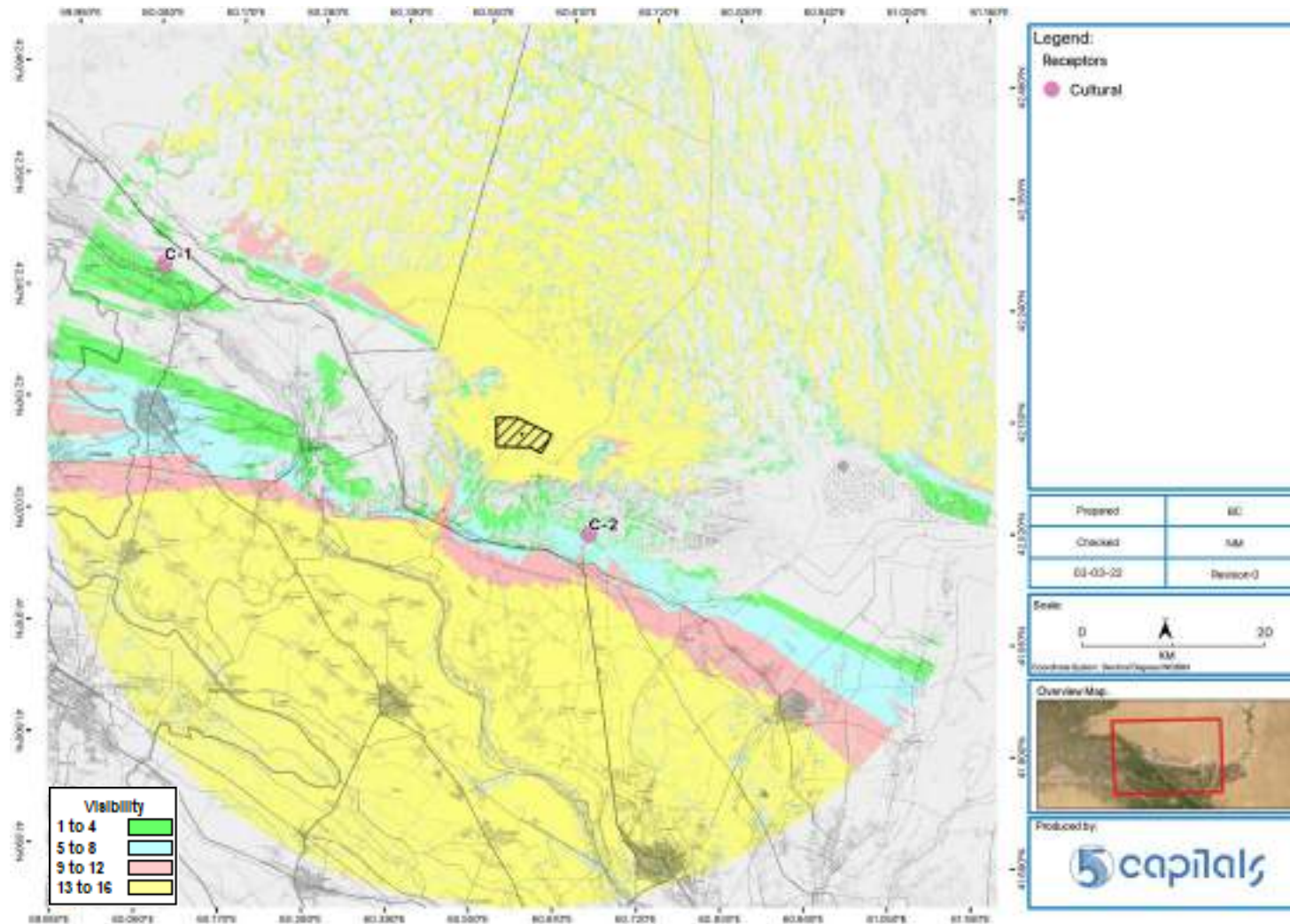


Figure 11-6 Blade Tip Zone of Theoretical Visibility

As is evident from the figures, the Karatau hills block the view of the Project from the immediate surrounding areas apart from towards the north, where there are no receptors. Further from the Project, towards the south in the agricultural areas, there are locations in which all turbines would potentially be visible by the farmers at these agricultural plots, however, it is noted that these locations are >20 km from the nearest turbine. Motorists will also have views toward the Project at certain locations on the nearby roads. Due to proximity to the Project and the unobstructed views, the herder will have an unobstructed view towards the turbines.

The Nacelle ZTV indicates that no nacelles would be visible from either of the two cultural receptors (C-1 and C-2), however the Hub Height ZTV indicates that three blade tips will be visible from Chilpak Kala (C-1), and the nearest turbine is NU-01 at approximately 40 km distance. Five blade tips will be visible at the Sultan Uwais Baba Complex (C-2) where the nearest turbine is NU-10 at a distance of 10 km.

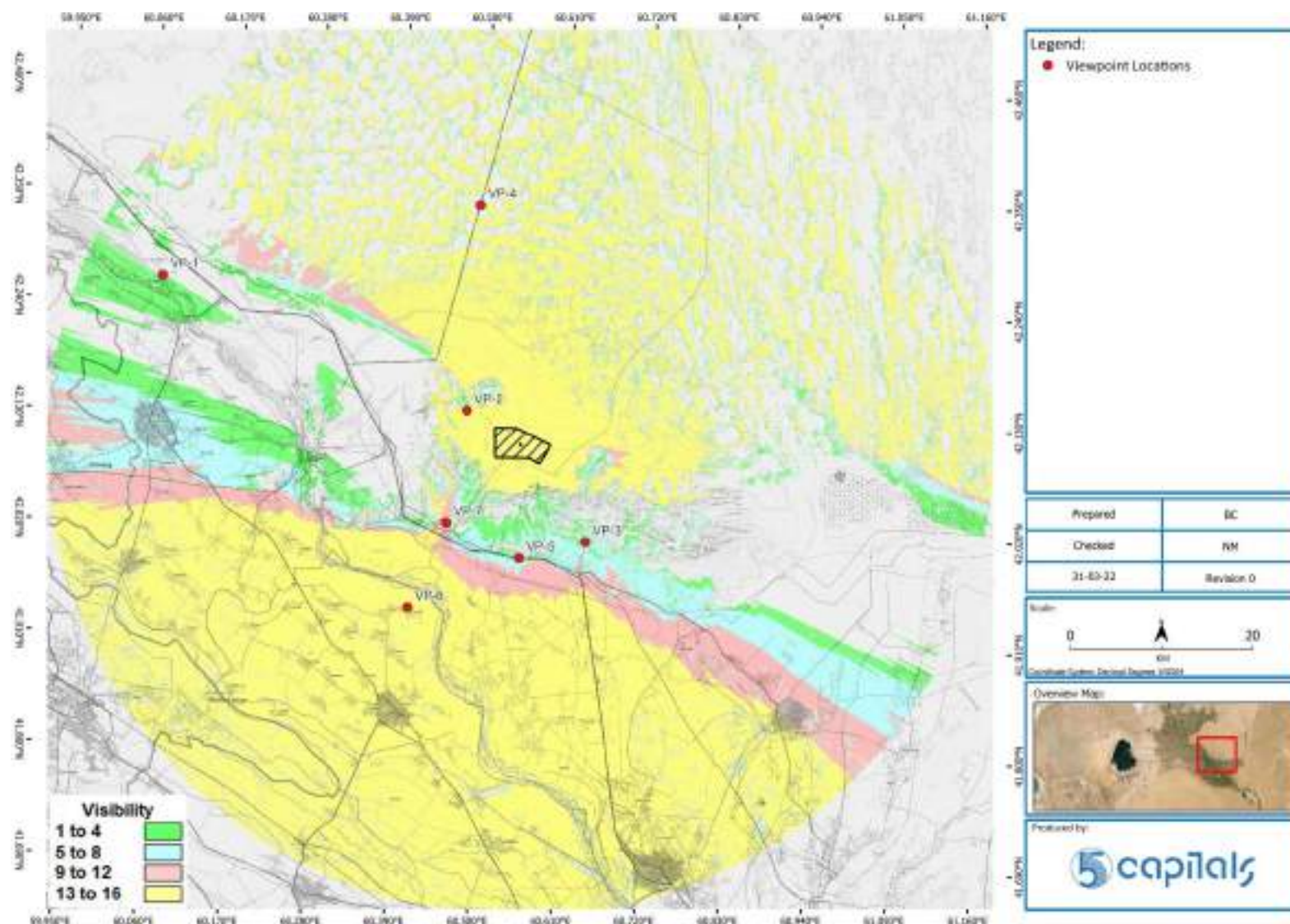
The construction and establishment of the OHTL will also result in landscape character changes and visual amenity impacts, however, as with the wind farm site, there are very few visual receptors. Closer to the A380, the OHTL will be visible to receptors such as those working at the cement factories, however, these are considered to be of low sensitivity and the landscape in this location is considered to be disturbed due to the proliferation of industrial activities.

The following are considered visual receptors to the Project. Some receptors are only considered as receptors during the operation phase, due to the height of the WTGs, and would not be receptors during the construction phase. The viewpoints associated with the receptors are shown in the following figure.

**Table 11-2 Visual Receptors**

RECEPTOR AND VIEWPOINT (VP)	PHASE	SENSITIVITY	JUSTIFICATION
Visitors at Chilpak Kala (C-1) (VP 1)	Operation	Medium	Visitors at Chilpak Kala will have an unobstructed view of the surrounding areas from this monument due to its elevation in comparison to the surrounding region. It is considered to be a locally important view / locally renowned viewpoint.
Motorists (VP 4 and 5)	Operation	Low	These visual receptors are considered to be of low sensitivity as they are expected to be engaged in activities that either distract from the view or require concentration on the foreground, resulting in minimal interest or appreciation of the view.
Cement Factory Staff (VP 7)	Construction		
Herders (VP 2)	Construction		
Farmers south of the Amu-Darya River (VP 6)	Operation		
The Sultan Uwais Baba Complex (C-2) (VP 3)	Operation		





## 11.3 Potential Impacts

### 11.3.1 Construction Phase

During the construction phase, the Project is likely to give rise to a number of changes to the landscape character and visual amenity, arising from site preparation and construction activities.

The construction phase is predominantly a period of temporary change; however any earthmoving, recontouring or building work can result in long lasting changes to the landscape.

In addition, the construction activities in themselves may also be a source of disruption and visual intrusion. The principal construction operations likely to have temporary effects on landscape character and visual amenity include:

- fixed and mobile construction plant;
- site compounds, utilities and protective hoardings;
- earthworks and construction of substructures (e.g. excavations, foundations and perimeter walls);
- construction of the vertical structures (the proposed turbines, OHTL towers);
- construction of the access road and internal road, and
- increase in movement and disturbance associated with construction works and the operation of construction plant.

The assessment of the potential effects of the Project on landscape character and views and visual amenity during construction is provided in the following tables.

**Table 11-3 Landscape Character Impacts - Construction**

LANDSCAPE RECEPTOR	SENSITIVITY TO CHANGE	DESCRIPTION OF IMPACT DURING CONSTRUCTION	IMPACT MAGNITUDE	POTENTIAL IMPACT SIGNIFICANCE
LCA 1 – Desert	Low	All the turbines will be located within this LCA as would, therefore, most of the construction activity. Construction traffic would use the existing road network and the proposed access route across the desert to access individual turbine locations. This would bring increased noise and activity levels directly affecting this LCA, although the movement of HGVs on the A380 would not be unusual. Such effects will be temporary and the erection of turbines would occur sequentially across the site, concentrating construction activities in localised areas. Construction of the Project would not affect any positive character features within this LCA or compromise its integrity.	Minor	Minor
LCA 2 – Karatau Hills	Medium	No turbines will be located within this LCA, however, construction would occur at near the foot of the hills, result in increased noise and activity levels. Construction activities will be out of character in this remote and undeveloped LCA. Construction of the Project would not affect any positive character features within this LCA or compromise its integrity.	Minor	Minor
LCA 3 – Industrial	Very Low	No construction activities would occur within this LCA, with a strong degree of separation due to the relative distance.	Neutral	Neutral
LCA 4 – Agricultural	Low	Construction of the Project would not affect any positive character features within this LCA or compromise its integrity.	Neutral	Neutral

**Table 11-4 Visual Amenity Impacts - Construction**

VISUAL RECEPTOR	SENSITIVITY	DESCRIPTION OF IMPACT DURING CONSTRUCTION	IMPACT MAGNITUDE	SIGNIFICANCE OF EFFECT
Herders (VP 2)	Low	During construction and assembly of the WTGs, the emergence of taller plant or structures as part of the Project would be very evident in the herders' view over a widespread area. The nearest turbine will be 3.8 km away from the nearest shelter belonging to the herder, and once constructed to full height it will be prominent in the view. The flat landscape and lack of intervening features in the direction of the view would allow much of the height of individual turbines to be apparent. Construction activities would include	Minor	Negligible



VISUAL RECEPTOR	SENSITIVITY	DESCRIPTION OF IMPACT DURING CONSTRUCTION	IMPACT MAGNITUDE	SIGNIFICANCE OF EFFECT
		the presence of construction traffic on the access road and this presence is out of keeping of the baseline situation. Effects relating to visibility of construction plant or partially erected structures on site, and the movement of construction traffic will be temporary.		
Cement Factory Staff (VP 7)	Low	Impacts will be similar to those experienced by the herder, however, it is unknown if the Cement Factory Staff will have windows directly overlooking the construction and it is considered likely that they will be engaged with activities in the foreground.	Minor	Negligible

### 11.3.2 Operation Phase

It is important to note that there are few landscapes in which a wind farm will not introduce a new and distinctive feature. Wind turbines are typically required to be tall and are frequently located in open or elevated landscapes, this means that they are often highly visible and incongruent with existing landscape character.

Principal aspects of the Project during operation which are likely to have permanent effects on the landscape character and visual amenity of the site and its surroundings are:

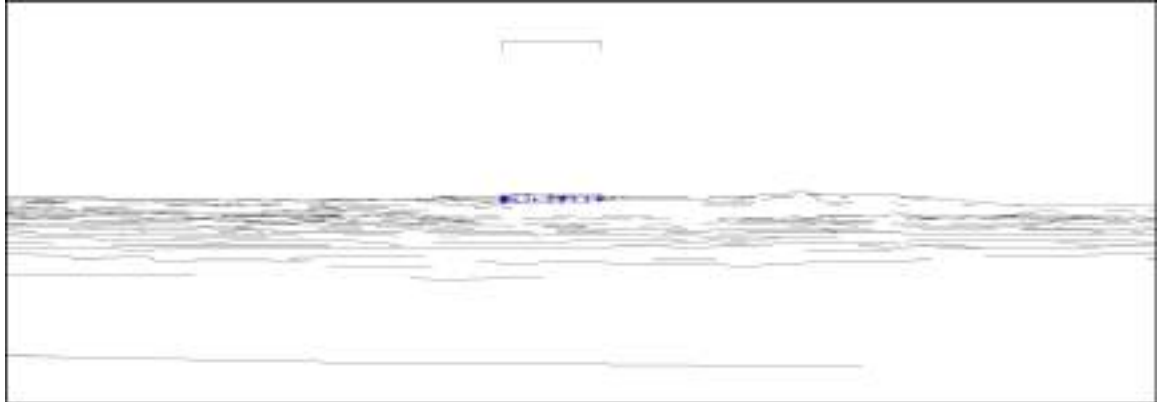


- the removal of open landscape and the introduction of 16 WTGs;
- the establishment of access road and internal road; and
- establishment of the OHTL and substation.

The impact of the completed works would persist during the operational life of the Project. The Project will remain fundamentally unchanged throughout the duration of its operational life. No changes in this period would be expected from mitigation or normal operation.

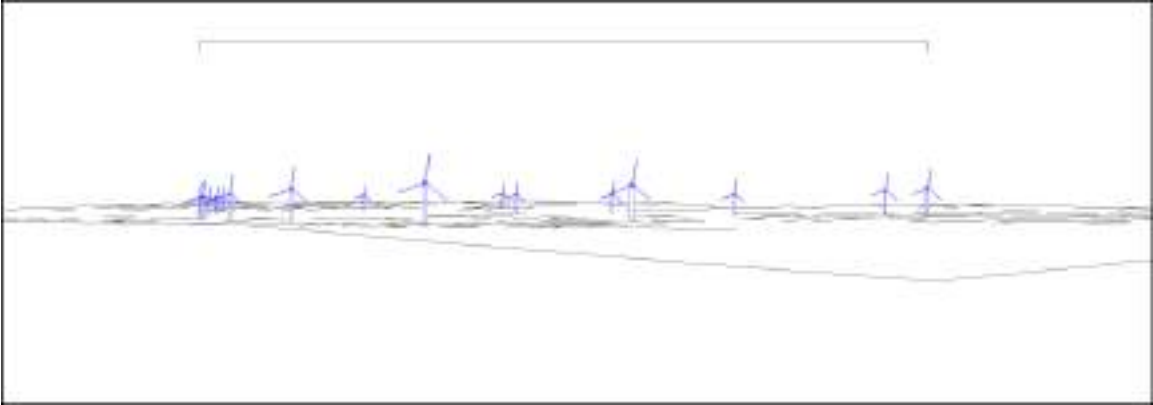
Operational visual effects are generally considered to be partially reversible / long-term temporary as, if decommissioned and not transferred, the turbines can be removed alongside the infrastructure at the end of the operational phase, and the land is restored to similar condition as to pre-construction.

Wireframes of the Project from the aforementioned visual receptors are shown in the following figures and further discussed in the following table.

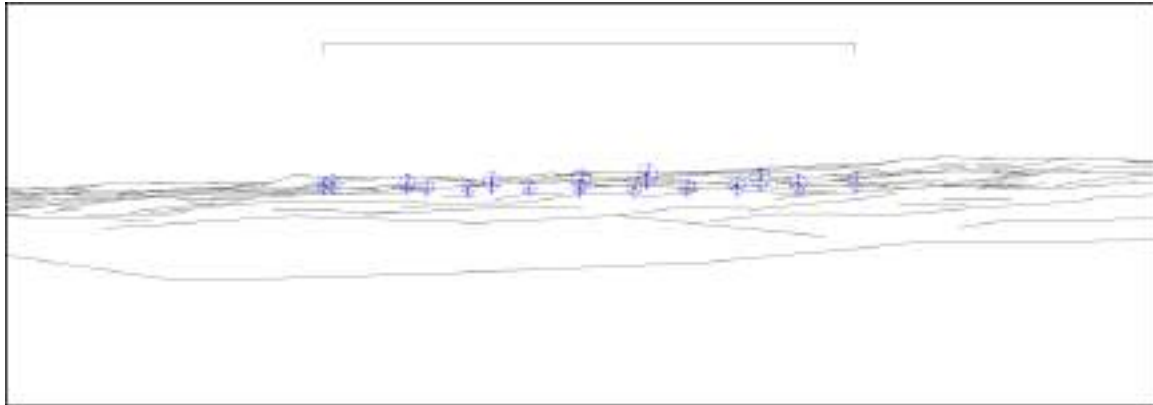
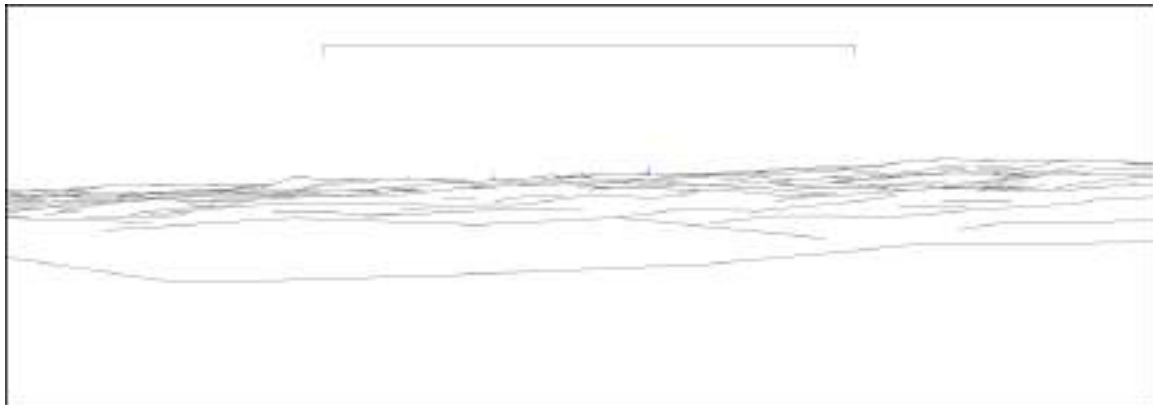
**Table 11-5 Viewpoint 1 Wireframe**

VIEWPOINT 1 – CHILPAK KALA (C-1) VIEWPOINT
<p><b>TRANSPARENT WIREFRAME</b></p> 
<p><b>WIREFRAME</b></p> 
<p><b>DESCRIPTION</b></p> <p>No nacelle would be visible but feasibly three blade tips could be visible from this viewpoint, however, as shown from the wireframe these would be extremely difficult to see even on periods of good visibility as the nearest turbine is 40 km away. During the visit to Chilpak Kala in December 2021 the visibility was extremely poor, as shown in the following figure. It is understood that this is often the case during the cooler months. Due to the distance and the fact that only three blade tips could be seen the impact is considered to be negligible.</p> 

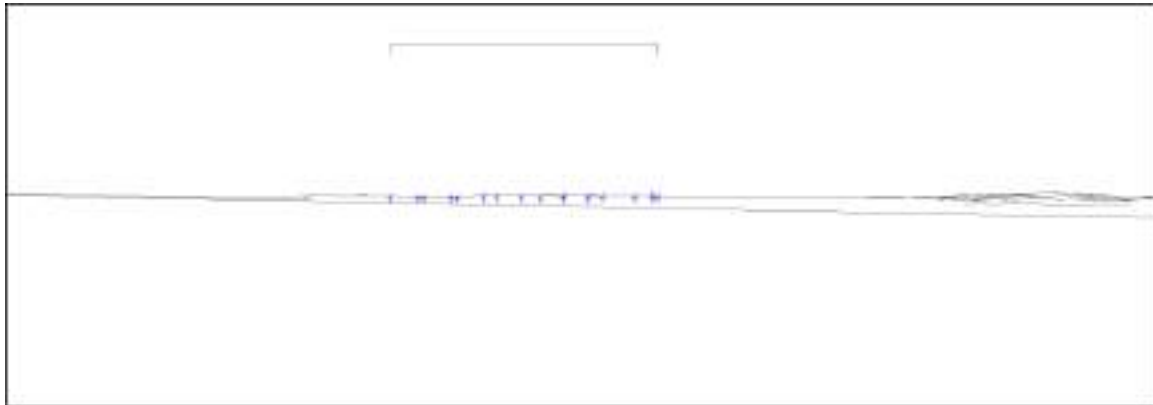
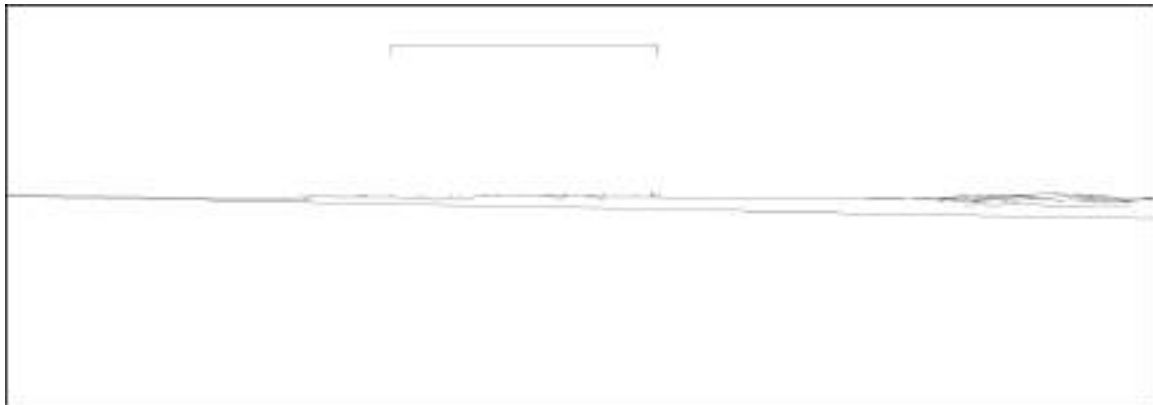
**Table 11-6 Viewpoint 2 Wireframe**

VIEWPOINT 2 – GUARD HOUSE OF HERDER (S-2) VIEWPOINT
<p><b>TRANSPARENT WIREFRAME</b></p>  <p><b>DESCRIPTION</b></p> <p>The view from S-2 towards the site would be unobstructed and the closest turbine is approximately 3.8 km away and therefore the turbines would be prominent across the landscape. Due to the proximity to the site and the unobstructed view the impact is considered to be of moderate magnitude.</p>

**Table 11-7 Viewpoint 3 Wireframe**

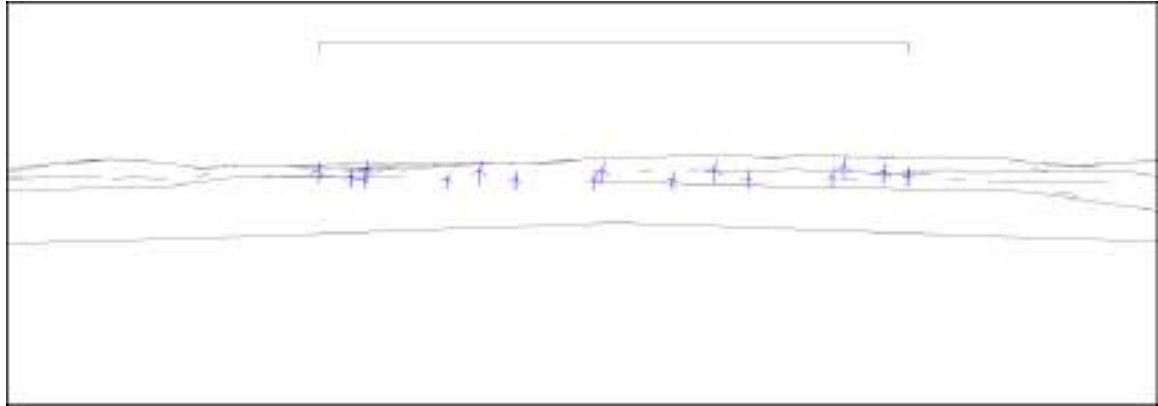
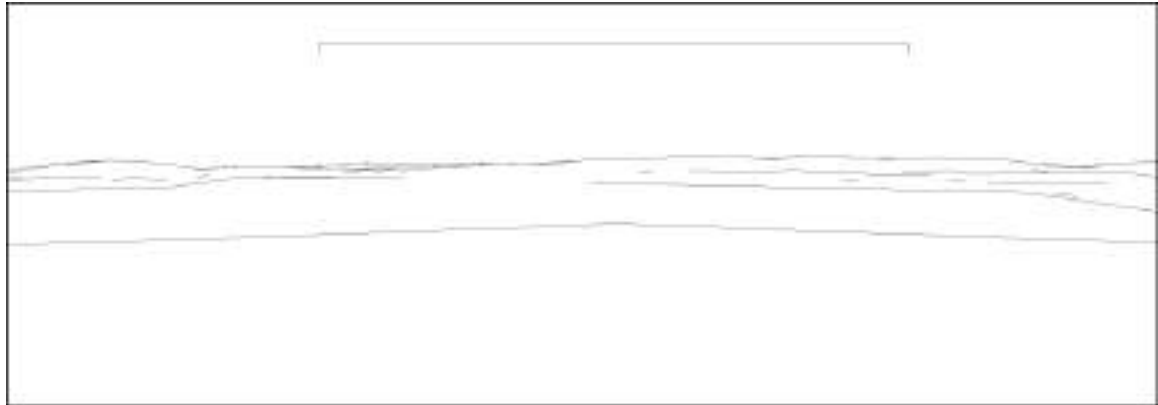
VIEWPOINT 3 – SULTAN UWAI'S BABA COMPLEX (C-2) VIEWPOINT	
<b>TRANSPARENT WIREFRAME</b>	
	
<b>WIREFRAME</b>	
	
<b>DESCRIPTION</b>	
<p>No nacelle would be visible but feasibly five blade tips could be visible from this viewpoint, however, as shown from the wireframe these would be relatively difficult to see and not considered to be a prominent feature on the landscape. The nearest turbine is 10 km away from this viewpoint. In addition, this viewpoint is not from a recognised viewpoint or even the most visited location of the Sultan Uwais Baba Complex, such as the visitor centre, but further within the complex. The magnitude is considered to be negligible.</p>	

**Table 11-8 Viewpoint 4 Wireframe**

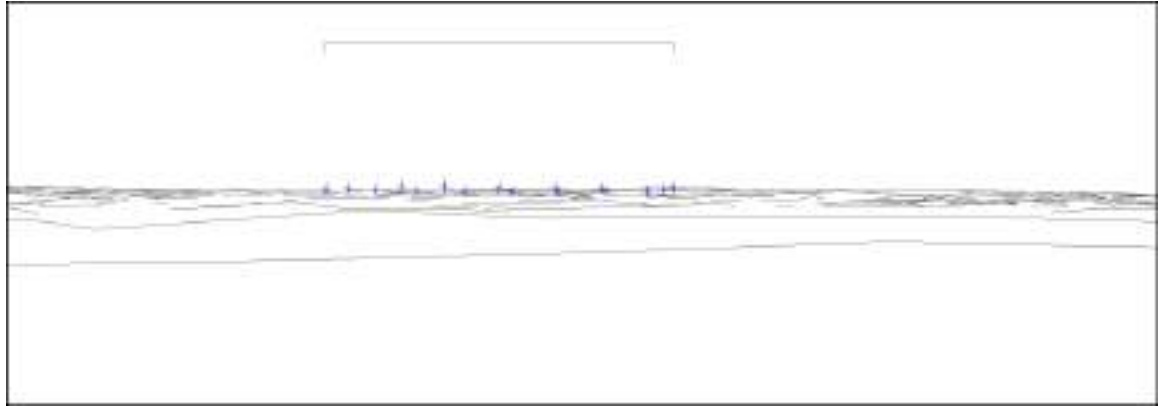
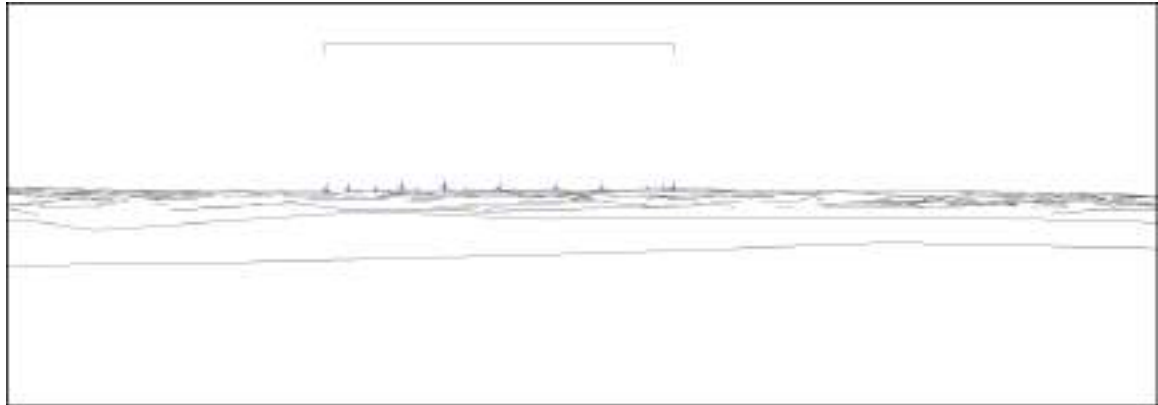
VIEWPOINT 4 – MOTORISTS TRAVELLING SOUTH ON THE 4P190 ROAD	
<b>TRANSPARENT WIREFRAME</b>	
<b>WIREFRAME</b>	
<p><b>DESCRIPTION</b></p> <p>Motorists travelling south on 4P190 would potentially be able to see 16 blade tips and 2 nacelles, however, the distance to the nearest turbine is 25 km and the majority of the Project is screened by topography. The magnitude is assessed to be negligible.</p>	



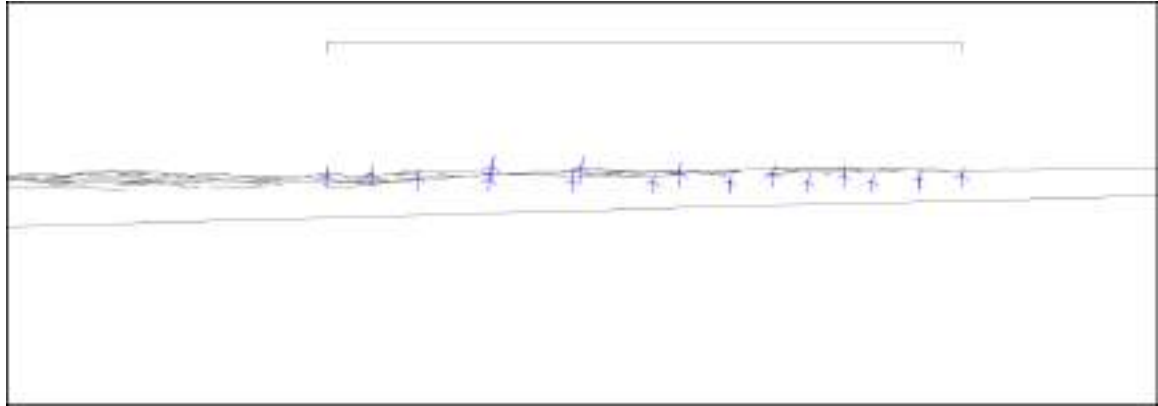
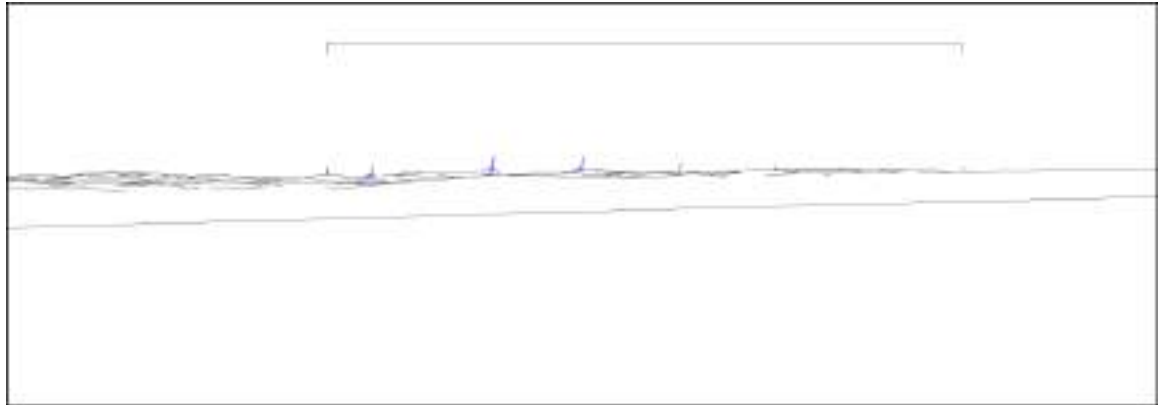
**Table 11-9 Viewpoint 5 Wireframe**

VIEWPOINT 5 – MOTORISTS TRAVELLING ON A380 ROAD	
<b>TRANSPARENT WIREFRAME</b>	
<b>WIREFRAME</b>	
<b>DESCRIPTION</b>	<p>Motorists on the A380 would potentially be able to see four blade tips but no nacelles due to the screening of the Project by topography. The magnitude is considered to be negligible.</p>

**Table 11-10 Viewpoint 6 Wireframe**

VIEWPOINT 6 – FARMERS SOUTH OF AMU DARYA	
<b>TRANSPARENT WIREFRAME</b>	
<b>WIREFRAME</b>	
<p><b>DESCRIPTION</b></p> <p>Farmers south of the Amu Darya river could feasibly see 16 blade tips and 10 nacelles, however, it is 20 km to the nearest turbine. The magnitude is considered to be minor.</p>	

**Table 11-11 Viewpoint 7 Wireframe**

VIEWPOINT 7 – CEMENT FACTORY STAFF	
<b>TRANSPARENT WIREFRAME</b>	
<b>WIREFRAME</b>	
<p><b>DESCRIPTION</b></p> <p>Staff at the cement factories could potentially see ten blade tips and three nacelles, however, the topography will screen the majority of the Project. It is 9 km to the nearest turbine and the magnitude is considered to be negligible.</p>	

**Table 11-12 Summary of Visual Amenity Impacts - Operation**

VISUAL RECEPTOR	SENSITIVITY	IMPACT MAGNITUDE	SIGNIFICANCE OF EFFECT
Visitors to Chilpak Kala (C-1)	Medium	Negligible	Negligible
Visitors to the Sultan Uwais Baba Complex (C-2)	Low	Negligible	Negligible
Herders	Low	Moderate	Minor
Cement Factory Staff	Low	Negligible	Negligible
Motorists	Low	Negligible	Negligible
Farmers	Low	Minor	Negligible

Impacts to landscape character are discussed in the following table.

**Table 11-13 Landscape Character Impacts - Operation**

LANDSCAPE RECEPTOR	SENSITIVITY TO CHANGE	DESCRIPTION OF IMPACT DURING OPERATION	IMPACT MAGNITUDE	POTENTIAL IMPACT SIGNIFICANCE
LCA 1 – Desert	Low	All the turbines will be located within this LCA. This LCA is a featureless landscape and therefore the Project would share a degree of consistency with the existing pattern and land use of the prevailing character, although the presence of turbines in previously undisturbed and tranquil parts would be very apparent and less compatible.	Moderate	Minor
LCA 2 – Karatau Hills	Medium	No turbines will be located within this LCA, however, the Project will be located near the foot of the hills, which will be out of character in this remote and undeveloped LCA.	Negligible	Negligible
LCA 3 – Industrial	Very Low	No turbines or operational activities will be located in this LCA, with a strong degree of separation due to the relative distance.	Neutral	Neutral
LCA 4 – Agricultural	Low	No turbines or operational activities will be located in this LCA, with a strong degree of separation due to the relative distance.	Neutral	Neutral

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## 11.4 Mitigation, Management & Residual Impacts

### 11.4.1 Mitigation and Management Measures

Visibility of a wind farm is inevitable and the efficacy of landscape and visual mitigation measures beyond the site selection and layout is extremely limited.

During both the construction and operation phase, good housekeeping will be implemented to ensure that there are no landscape and visual impacts relating to wastes and litter. In addition, during the construction phase, construction activities will be limited to the areas required and works will not be allowed to spill out unnecessarily.

### 11.4.2 Residual Impacts

Residual impacts will be the same as the initial significance due to the fact that no major mitigation and management measures have been proposed besides the GIIP stated previously.

## 11.5 Monitoring

No monitoring is proposed for landscape and visual impacts.



## 12 SHADOW FLICKER

### 12.1 Overview

Wind turbines can cause 'Shadow Flicker' when the sun passes behind a moving blade and casts a shadow on the window of nearby premises. Shadow flicker for the purposes of assessment is described as:

*'Shadow flicker from wind turbines is defined as alternating changes in light intensity caused by rotating blades casting shadows on the ground and stationary objects such as a window at a dwelling. No shadow will be cast when the sun is obscured by clouds/fog or when the turbine is not operating. Shadow-flicker can occur in project area homes when the turbine is located near a home and is in a position where the blades interfere with very low-angle sunlight. The most typical effect is the visibility of an intermittent light reduction in the rooms of the home facing the wind turbines and subject to the shadow-flicker. Such locations are referred to as shadow-flicker receptors. Obstacles such as terrain, trees, or buildings between the wind turbine and a potential shadow-flicker receptor significantly reduce or eliminate shadow-flicker effects.'*

Shadow flicker will depend on the following variables:

- The turbine hub height and rotor diameter;
- The distance from the turbines;
- The direction of the residence relative to the turbines;
- The time of year and wind direction;
- The proportion of daylight hours in which the turbines operate; and
- The frequency of bright sunshine and cloudless skies (particularly at low elevations above the horizon).

### 12.2 Applicable Requirements & Standards

#### 12.2.1 National Requirements

There are no national requirements for shadow flicker.

#### 12.2.2 Lender Requirements

The WBG/IFC EHS Guidelines for Wind Energy (2015) sets the following screening criteria for wind farms:

*"If it is not possible to locate the wind energy facility/turbines such that neighbouring receptors experience no shadow flicker effects, it is recommended that the predicted duration of shadow flicker effects experienced at a sensitive receptor not exceed 30 hours per year and 30 minutes per day on the worst affected day, based on a worst-case scenario."*

In order to assess compliance with the recommended limits, shadow flicker should be modelled and predicted based on an astronomical worst-case scenario, which is defined as follows:

- There is continual sunshine and permanently cloudless skies from sunrise to sunset.
- There is sufficient wind for continually rotating turbine blades.
- Rotor is perpendicular to the incident direction of the sunlight.
- Sun angles less than 3 degrees above the horizon level are disregarded (due to likelihood for vegetation and building screening).
- Distances between the rotor plane and the tower axis are negligible.
- Light refraction in the atmosphere is not considered.

## 12.3 Shadow Flicker Assessment

A shadow flicker assessment has been undertaken for the Project in accordance with the IFC/WBG environmental guidance on Wind Energy projects.

### 12.3.1 Methodology

The assessment of receptors potentially susceptible to shadow flicker (e.g., human settlements) within a distance of ten rotor diameters from proposed turbine locations is internationally considered to be an acceptable distance limit for the shadow flicker studies. However, for a robust approach, all human settlements within a 6000 m radius of any given turbine location have been included for analysis. Therefore, the three shelters belonging to the herder have been included in this shadow flicker assessment. Receptor details are shown in the following table.

**Table 12-1 Shadow Flicker Receptors Considered**

RECEPTOR ID	DESCRIPTION	NEAREST TURBINE	DISTANCE TO NEAREST TURBINE (m)
A	Summer Settlement (S-1)	NU-01	5,819
B	Guard House (S-2)	NU-01	3,897
C	Winter Settlement (S-3)	NU-02	5,591

Shadow flicker was modelled using WindPRO (v3.5), an industry-leading software package for the design and planning of wind energy projects. The model software considers the sun's path

with respect to every turbine location during every minute over a complete year. Any shadow flicker caused by each turbine is then aggregated for each receptor for the entire year.

The input parameters for the model include:

- the turbine locations and dimensions;
- the receptors location; and
- the size of windows on each receptor and the direction that the windows face.

The following WTG characteristics were used in the model.

**Table 12-2 WTG Characteristics for Shadow Flicker Modelling**

ROTOR DIAMETER (M)	HUB HEIGHT (M)	BLADE LENGTH (M)	ROTOR SWEEP AREA (M <sup>2</sup> )	ROTOR SPEED RANGE (RPM)
171	120	83.9	22965	7.1 – 9.94

The topography model used for the assessment was obtained from the SRTM, at 30 m resolution.

The following scenarios are considered:

- As per IFC's worst-case; and
- A realistic scenario based upon site data (e.g., long term average sunshine hours rather than the worst-case IFC scenario of constant sunshine).

For the IFC worst-case scenario, the following has been considered:

- there is a clear sky 365 days per year;
- the turbine blades were assumed to be rotating for 365 days per year;
- The effect of shadow flicker was not calculated where the sun lies less than 3 degrees above the horizon;
- the receptor is occupied at all times;
- no screening (from either trees or man-made obstacles) is taken into account; and
- all receptors have a 1 m x 1 m window facing directly towards the turbine;

These assumptions result in a robust but conservative estimation because:

- unlikely to have clear skies all year around;
- screening can mask shadows from the turbines;
- all the turbines may not be operational all year;
- turbine blades will not face the shadow receptor all year (as blades will face the direction of wind to be fully efficient);

- shadow receptors may not be occupied during a shadow flicker event; and
- the intensity of any shadow flicker event will be diminished by the intervening distance.

For a more realistic consideration, long term weather conditions were obtained from Aralskoe More meteorological dataset and the sunshine probability used for the model is set out in the following table.

**Table 12-3 Sunshine Hours for Realistic Scenario**

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4.02	5.86	6.74	8.73	10.85	12.60	12.09	11.15	9.89	6.83	4.33	3.17

However, as the geographical extent of the study is large, screening (trees or man-made obstacles) was not considered for the realistic scenario.

### 12.3.2 Results

The model has predicted the following shadow flicker effects for the receptors under consideration.

**Table 12-4 WTG Characteristics for Shadow Flicker Modelling**

SHADOW RECEPTOR	SHADOW, WORST CASE		MAX SHADOW	SHADOW, EXPECTED VALUES SHADOW HOURS
	PER YEAR	PER YEAR	HOURS PER DAY	PER YEAR
	H/YEAR	DAYS/YEAR	H/DAY	H/YEAR
A – Summer Settlement (S-1)	0.00	0	0.00	0.00
B – Guard House (S-2)	0.00	0	0.00	0.00
C – Winter Settlement (S-3)	0.00	0	0.00	0.00

As can be seen for the above results, none of the assessed locations exceed the IFC worst-case criteria (30 hours per year or less than 30 mins per day) and therefore no mitigation measures are necessary for shadow flicker impacts, nor is any monitoring.

The following figures depict the modelled shadow flicker results.

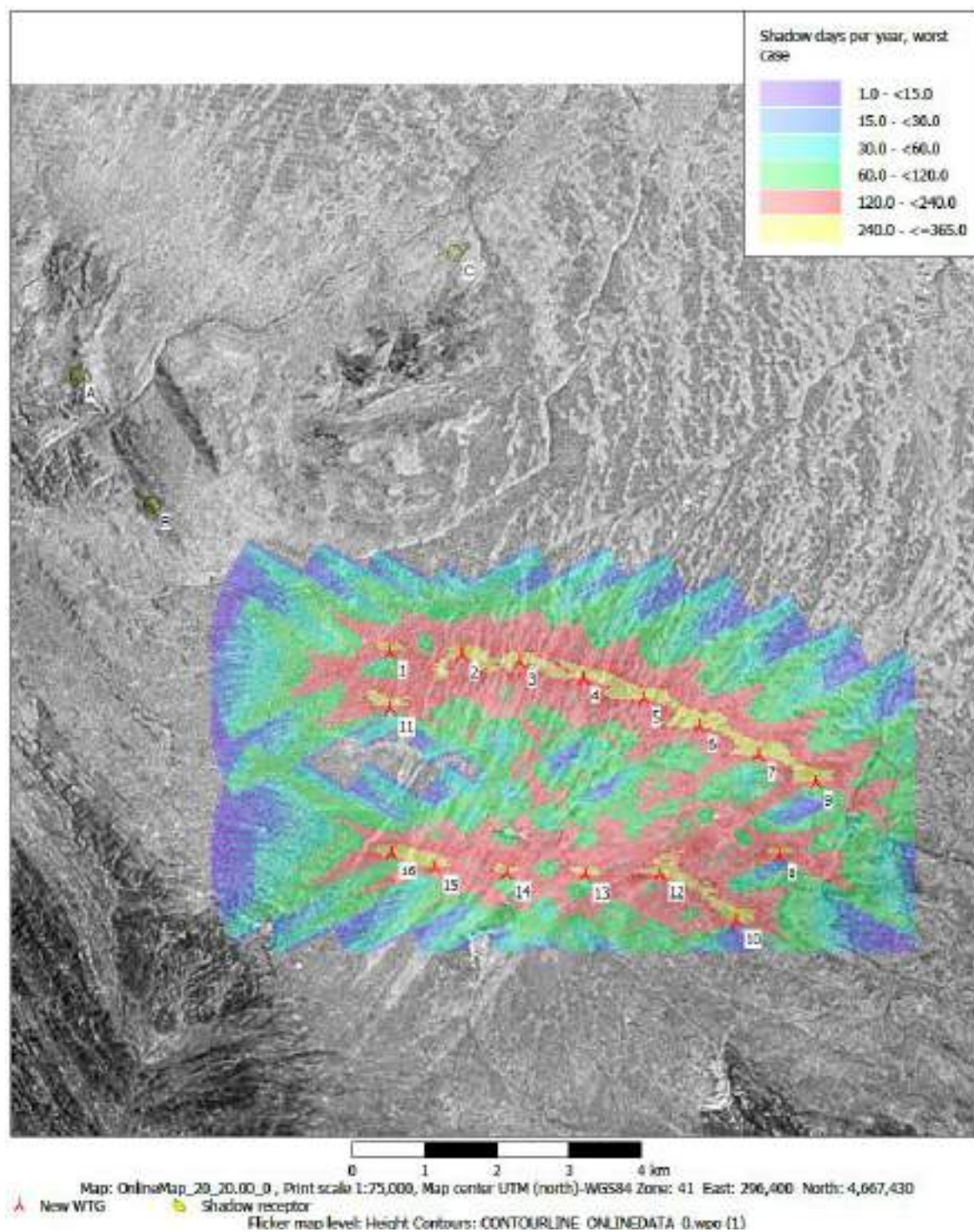


Figure 12-1 Shadow Days per Year, Worst Case



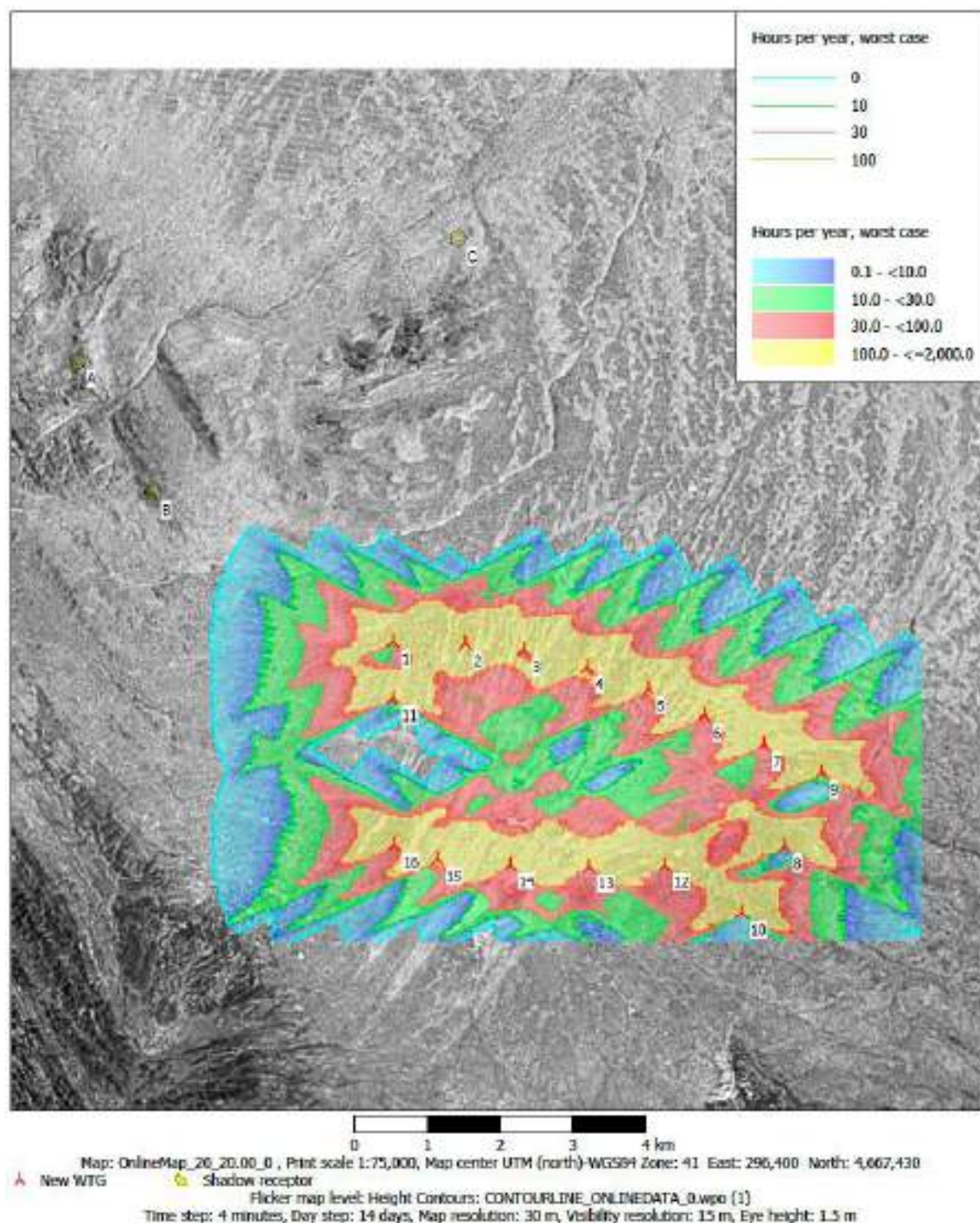
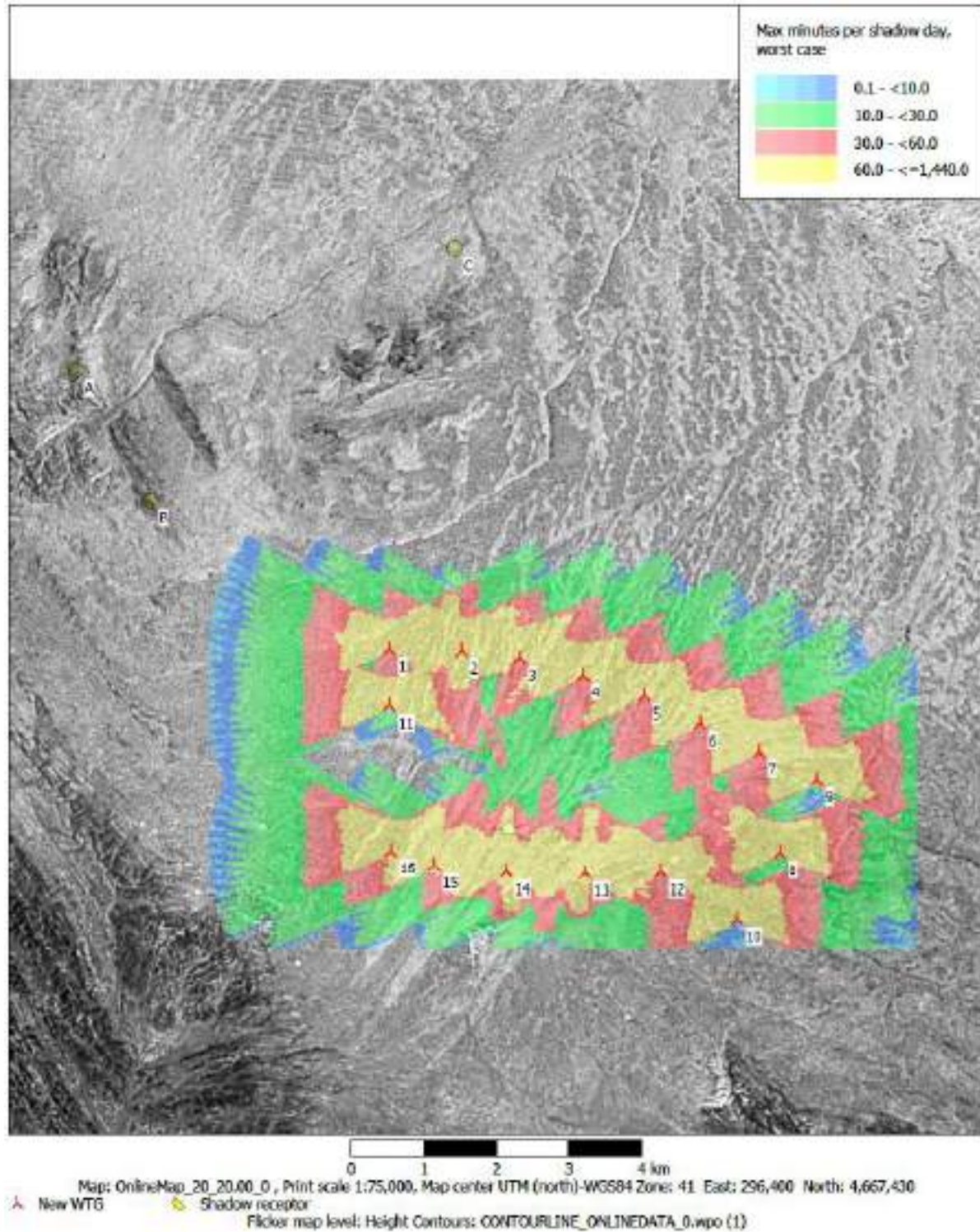


Figure 12-2 Hours per Year, Worst Case





**Figure 12-3 Max Minutes per Shadow Day, Worst Case**

## 13 SOLID WASTE AND WASTEWATER MANAGEMENT

This chapter assesses the Project's expected generation of solid waste and wastewater during the construction and operational phases. It does not consider the significance of impacts with respect to a specific receptor (e.g., soil or groundwater quality); impacts to soil or groundwater quality with respect to solid and liquid waste management have been assessed in the Geology, Soils and Groundwater Chapter of this ESIA.

The primary purpose of this chapter is to identify specific management measures in regard to solid waste and wastewater generation that can be adopted in the construction & operational phase ESMS in order to ensure alignment with GIMP and compliance with applicable regulations and standards.

### 13.1 Applicable Requirements & Standards

#### 13.1.1 National Regulations

##### **THE LAW OF THE REPUBLIC OF UZBEKISTAN "ON WASTES" (2002) AMENDED IN 2019**

The principal objective of this law is to prevent the negative impacts of solid wastes on human lives and health as well as the environment, reduce waste generation and encourage rational use of waste reduction techniques.

Article 19 states that provided generated waste is subject to export and import operations, or hazardous waste is subject to transportation, an environmental certification procedure shall be completed by the Project to confirm compliance with sanitary and environmental norms and standards associated with waste management.

Article 20 states that transportation of hazardous waste shall be in specially designated types of vehicles with a waste certificate and permit. The responsibility for safe transportation of hazardous waste shall be with the transporting organisation.

Article 22 of the Law on Wastes specifies the general requirements for waste storage and disposal. Waste disposal of recyclable waste is prohibited in Uzbekistan. In addition, storage and disposal of waste in the environment including in nature conservation and protected areas, settlements, health and recreational areas or historical and cultural facilities is prohibited.

## **SANPiN No 0127-02 – “SANITARY PROCEDURES FOR INVENTORY, CLASSIFICATION, STORAGE AND DISPOSAL OF INDUSTRIAL WASTE”**

This regulation and norm ensure optimal hygienic accounting and inventory of industrial wastes, determination of toxicity index and classification of industrial waste by hazard classes with optimal selection of ways to neutralise and utilise them.

SanPiN of the Republic of Uzbekistan dated 29/7/2002 No 0128-02 – “Hygienic classifier of toxic industrial wastes in the Republic of Uzbekistan. Hazardous waste is classified into four groups known as “hazard classes”. Waste hazards are assessed based on this law. Hygienic classifier of industrial hazardous waste and SanPiN No 0127-02-Sanitary procedures for industrial waste inventory, classification, storage and disposal. Waste hazard classes include:

- Class I: Extremely hazardous waste;
- Class II: Highly hazardous waste;
- Class III: Moderately hazardous waste;
- Class IV: Low hazardous waste; and

Other relevant regulations and standards relating to waste include:

- SanPiN № 0157-04 “Sanitary requirements to the storage and neutralization of solid domestic waste on special grounds in Uzbekistan”
- SanPiN of the Republic of Uzbekistan dated 16/11/2011 No 0300-11 “Sanitary Rules and Standards for managing collection, inventory, classification, treatment, storage and disposal of industrial waste in the context of Uzbekistan
- Regulation “On the Procedure for the Disposal, Collection, Pay Settlement, Storage and Removal of Waste Industrial Oils” annexed to the Decree of the Cabinet of Ministers dated 04/09/2012 No.258
- Regulation on the Procedure for Handling Coloured and Black Metal Scrap” annexed to the Decree of Cabinet of Ministers dated 06/06/2018 No. 425
- SanPiN No. 0158-04 - Sanitarian Rules and Norms on collection, transportation and disposal of wastes contained asbestos in Uzbekistan.
- Resolution of the President of The Republic of Uzbekistan of April 17, 2019 No. Pp-4291 - Approval of Strategy According To The Treatment of Municipal Solid Waste In The Republic of Uzbekistan For 2019-2028

### **13.1.2 Lender Requirements**

#### **SOLID WASTE**

##### EBRD

EBRD PR3 on Resource Efficiency and Pollution Prevention and Control establishes general requirements with regards to waste management as follows:

- The Project must strive to avoid the generation of hazardous and non-hazardous waste materials and reduce their harmfulness as far as practicable. Where waste generation cannot be avoided, the waste must be reused, recycled or recovered, or used it as a source of energy. Where waste cannot be recovered or reused, the waste must be treated and disposed of it in an environmentally sound manner;
- The Project must identify technically and financially feasible alternatives for the environmentally sound disposal of any hazardous waste considering the limitations applicable to trans boundary movement; and
- When waste disposal is transferred offsite and/or conducted by third parties, chain of custody documentation to the final destination must be obtained and only contractors that are reputable and legitimate enterprises licensed by the relevant regulatory agencies must be commissioned. The Project must ascertain whether licensed disposal sites are being operated to acceptable standards. Where this is not the case, alternative disposal options must be considered, including the possibility of the Project developing its own recovery and disposal facilities at the project site.

#### EPFIs

Section 1.6 of “the IFC General EHS Guidelines” is entitled Waste Management and is applicable to all projects that generate, store or handle any quantity of waste; whilst Section 1.5 of the IFC EHS Guidelines covers Hazardous Materials Management. The waste management guidelines state that facilities that generate and store wastes should practice the following:

- Establish waste management priorities at the outset of activities;
- Identify EHS risks and impacts and consider waste generation and its consequences;
- Establish a waste management hierarchy that considers prevention, reduction, reuse, recovery, recycling, removal and finally disposal of wastes;
- Avoid or minimize the generation of waste materials, as far as practicable;
- Identify where waste generation cannot be avoided but can be minimized or where opportunities exist for, recovering and reusing waste; and
- Where waste cannot be recovered or reused, identify means of treating, destroying, and disposing of it in an environmentally sound manner.

#### **WASTEWATER**

##### EBRD

EBRD PR3 on Resource Efficiency and Pollution Prevention and Control establishes general requirements for wastewater management as follows:

- The Project must seek to minimise water usage in order to minimise wastewater generation; and

- The Project must identify technically and financially feasible techniques for reusing and recycling effluents in accordance with GIP, which should be implemented as part of the project design.

#### EPFIs

The IFC/WBG General EHS Guidelines (2007) establish general requirements for direct or indirect discharge of wastewater from utility operations or storm water to the environment.

*'Projects with the potential to generate process wastewater, sanitary (domestic) sewage, or storm water should incorporate the necessary precautions to avoid, minimize, and control adverse impacts to human health, safety, or the environment'.*

## **13.2 Baseline Conditions**

### **13.2.1 Solid Waste**

Waste management in Uzbekistan is an issue as waste is being collected and disposed in dump sites in the absence of proper management practices and infrastructures including sorting facilities or landfills. In 2019, a Solid Waste Management Strategy for the period of 2019 – 2028 was put in force. According to the Resolution of the President of The Republic of Uzbekistan Of April 17, 2019 No. Pp-4291 *"In the absence of sufficient waste management services only 40 - 50% of the municipal solid waste generated in rural settlements is being collected while these services are almost absent in the remote rural areas"*. The objective of the strategy is to enhance the waste management services including transportation, storage, disposal and recycling.

Toza Hudud and its district/city branches are in charge of collecting, transporting, and disposing MSW in Karakalpakstan. EBRD have recently announced that they are extending long-term sovereign loans of up to US\$120 million for the benefit of Toza Hudud, the regional utility company responsible for solid waste management in Horezm and Karakalpakstan (Usov, 2022).

EBRD state that Karakalpakstan occupies more than one-third of Uzbekistan's total territory and the almost 2 million inhabitants generate around 187,000 tonnes of solid waste a year. Half the region's population lives in rural areas and only a third of local residents are covered by waste collection services.

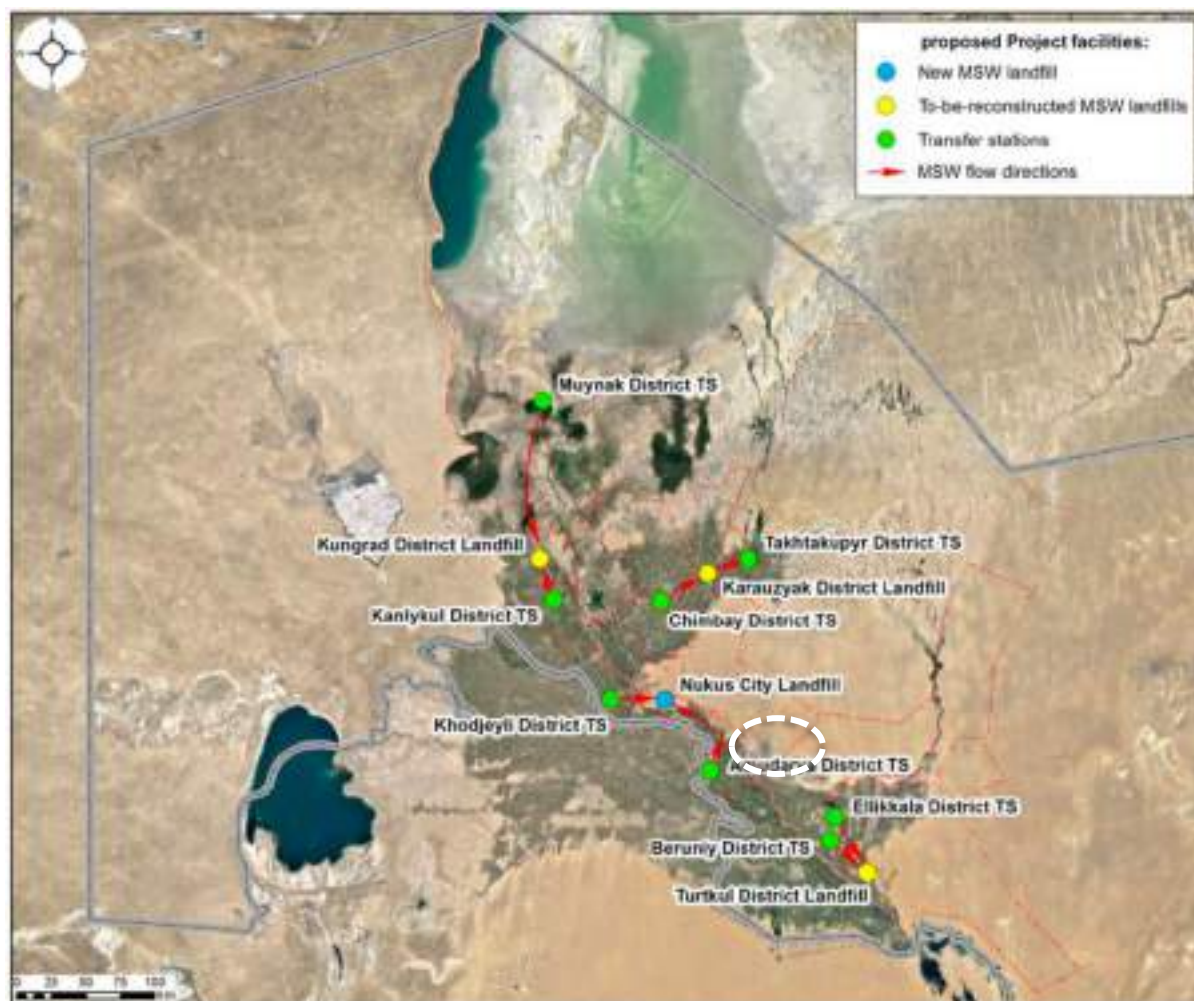
The US\$70 million loan will enable a new EU standards-compliant sanitary landfill to be built in Nukus and the reconstruction of three existing waste disposal sites, located in the Turtkul, Kungrad and Karauzyak districts. The Project also includes the construction of eight transfer stations (in the Amydarya, Khodjeyli, Beruniy, Ellikkala, Kanlykul, Muynak, Chimbay and



Takhtakupyr districts (which are planned to be located at the sites of the existing district landfills).

The locations of existing and planned waste management infrastructure relative to the Project are shown on the following figure. The approximate Project location is shown by the circle with a white dash outline.

As is evident from the figure, the site is located between the Karauzyak and Turtkul District Landfills, while the proposed Nukus City Landfill will be closer to the site. The Amydarya waste transfer station is the closest transfer station.



**Figure 13-1 Scope of the Karakalpakstan Solid Waste Project (CECT, 2022)**

The tender process for design and build contracts for the Karakalpakstan Solid Waste Project is expected to commence in late 2022 – early 2023; construction works will indicatively start in the second half of 2023 subject to successful procurement and following completion of detailed design. The construction period will be 2 – 3 years.



### 13.2.2 Wastewater

In Uzbekistan in 2016 roughly 3.7 million people (12 percent of the total population) were reported to be served by a centralised sewerage system, most of them in Tashkent city and Tashkent region. In other regions, on average only five percent of the population is connected to a centralized sewerage system (World Bank Group, 2020). The status of rural sanitation is not well documented and has largely been left to the initiative of households and communities. Most households in rural areas rely on self-built, onsite sanitation such as dry pit latrines or, for households with indoor bathroom facilities, septic tanks with on-site disposal. Where households have septic tanks, emptying / servicing them is the responsibility of the Suvokova (or water utility provider), on a demand basis.

The World Bank currently have an active project titled 'Uzbekistan – Water Services and Institutional Support Project' of which one component includes the reconstruction and expansion of sewerage systems in selected subproject areas within Nukus, Takhiatash and Khodjeyli of Karakalpakstan.

In addition, the Asian Infrastructure Investment Bank (AIIB) have a project listed on their website titled 'Uzbekistan: Karakalpakstan and Khorezm Water Supply and Sanitation Project.' Component 2 of the project includes the *"Construction of centralized sewage systems in 10 district centers in the Republic of Karakalpakstan and 8 district centers in Khorezm Region consisting of collectors, pumping stations, new construction of sewerage system and sewage treatment plants as well as discharge and optional reuse facilities."*

It is therefore understood that projects are underway to improve the existing wastewater management facilities in the region, and the nearest facility is expected to be in Nukus.

### 13.2.3 Site Specific Information

Consultations were conducted in order to understand waste and wastewater management in the Project area.

#### **BERUNIY KHOMIYAT**

The Deputy Chair of the Beruniy Khomiyat responded to consultation letters on the 7<sup>th</sup> September 2022 with details regarding locations of three waste and wastewater facilities in the region located in the Qizil Qala Community (20 km from the nearest WTG), the Abay Community (23 km from the nearest WTG) and in Beruniy (47 km from the nearest WTG).

No further details of their capacity or treatment options were provided.

## Karauzak Khomiyat

The Deputy Chair of the Karauzak Khomiyat responded to consultation letters on the 12<sup>th</sup> September 2022 stating that there are no facilities for wastewater treatment or landfills in the Karauzak districts, however, provided contact details for the Head of the "Korakalpak Water Supply" LLC and Head of the state unitary enterprise "Toza Hudud" of the Republic of Karakalpakstan.

### LOCAL HERDER

In consultations with the herder who has shelters close to the Project and lives in Beruniy, he stated that waste is collected from their house (in Beruniy) once a week by the government waste management organisation and that their wastewater system is decentralised, however no further details were provided.

## 13.3 Potential Impacts

### 13.3.1 Construction Phase

The construction phase will produce significantly more waste than the operation phase and, if not managed in line with GIIP, can result in environment and social impacts.

#### 13.3.1.1 Solid Waste

Waste will be generated from the construction of the wind farm, access road, OHTL and substation and will be generated in all stages of construction. Typical construction wastes include concrete, asphalt, scrap metal, glass, plastic, wood, packaging materials, excess cables, and domestic waste from construction workers (i.e., relating to food consumption).

Solid waste generated during the construction phase will include the following:

- Non-hazardous wastes such as:
  - Wastes related to construction processes, including earthworks (such as rubble, soils and potentially rock) and installation (such as bolts, rebar, etc.);
  - Paper/cardboard, plastics, packaging, plastic bottles, glass, scrap metal, excess fill materials, sand, gravel, excess construction materials, concrete, subsoil and rock; and
  - Domestic waste generated by the construction workforce (e.g., food/organic waste, paper, cardboard, aluminium, plastic), including wastes generated in accommodation facilities.
- Hazardous wastes such as
  - Batteries (unused), chemical drums, aerosol cans, contaminated metals, expired and unused chemicals, adhesives, lubricants, clean-up materials

such as rags, containers and tins with remains of hazardous substances, used spill kits and clean-up materials;

- Replacement parts from vehicles, plant and equipment; and
- Residual materials from electrical equipment installation such as Waste Electrical Equipment (WEE).

As there are only 16 WTGs, and construction locations will be discrete, it is considered unlikely that considerable amounts of waste will be generated. In addition, construction of both the wind farm and the OHTL will comprise primarily of the assembly of prefabricated structures, and therefore, the amount of solid waste that will be generated along the OHTL route will not be significant. However, inappropriate handling, storage, transport and/or disposal of these solid wastes may pose the potential to pollute the surrounding environment (i.e. soil and groundwater resources), cause odour and visual nuisance, encourage pests or result in occupational health and safety issues.

#### **NON-HAZARDOUS SOLID WASTE**

Non-hazardous construction waste is typically inert and does not readily pose a threat to human health or the environment (apart from certain scenarios e.g., ingested by fauna). However, proper management is required in order to reduce associated secondary impacts such as unnecessary resource use, dust emissions, etc.

#### **HAZARDOUS SOLID WASTE**

Due to the nature of the Project and the construction works being undertaken, there will be limited hazardous materials used. Such materials may result in fuel containers waste, oily residues, paints, paint cans and wastes from chemical cleaning products.

Although the hazardous fraction of construction waste is expected to represent a relatively small portion of the total amount of construction waste likely to be generated, its management requires careful consideration as the impacts associated with hazardous waste can potentially result in contamination to soils and groundwater, as assessed in the Geology, Soils and Groundwater Chapter of this ESIA.

Inappropriate management, storage, handling, transfer or transportation of hazardous wastes through lack of personnel training on site may lead to accidental spills or leaks, resulting in environmental impacts and potential health risk to workers. Contamination events may also arise as a result of transportation by unlicensed waste contractors or disposal to unlicensed/unauthorised landfills. Waste management planning is therefore critical in order to minimise potential significant impacts.

At this stage it is not known if the landfills in the region (Turtkul and Karauyzak) accept hazardous wastes, and this will need to be confirmed by the EPC Contractor. Hazardous waste

generated by the Project will most likely be transported by road vehicles to a licensed hazardous waste facility, either one of these two landfills or a location outside the region. Therefore, it will be particularly important to properly store the waste in designated and secured hazardous waste storage areas at the site until collection for final disposal. These areas will include secondary containment and drip trays to contain spillages, secure fencing to control access, proper safety signage and a roof structure to prevent rain water entering and dispersing hazardous substances.

The EPC Contractor will be required to coordinate with the local government to identify licensed waste collectors and disposal sites.

### 13.3.1.2 Wastewater

Wastewater generated from the Project's construction activities includes the following:

- Sanitary and domestic wastewater generation;
- Wastewater from any vehicles or equipment washing/cleaning
- Liquid hazardous waste such as fuels, chemicals, paints, lubricants, solvents, waste oil, hydraulic fluid, resins, waste solvents and thinners, etc.; and
- Concrete washout.

At the time of writing, it has not been confirmed if a concrete batching plant will be used at site during the construction phase. This will impact the amount of concrete washout produced at site. Once confirmed, further details on concrete washout will be included as well as key potential impacts and good practice to mitigate risks.

For sanitary and domestic wastewater, it is anticipated that there will be 150 workers at the peak period of construction.

The quantities of sanitary & domestic wastewater can be estimated as an average of 0.1 m<sup>3</sup>/person/day (100 litres). Therefore, wastewater is estimated to total 15 m<sup>3</sup> at peak periods of construction. It should be noted that the figure of 0.1 m<sup>3</sup>/person/day relates to overall water consumption including at accommodation areas and includes any use of water for washing, cleaning purposes etc.

Wastewater will be stored within septic tanks on-site, prior to removal by a licensed contractor. It is expected that wastewater will be taken to a facility in Nukus, although this will be confirmed by the EPC Contractor. Improper handling, storage and transportation of sanitary and domestic wastewater could potentially cause contamination to soil or groundwater resources; as assessed in the Geology, Soils and Groundwater Chapter of this ESIA.

### 13.3.2 Operation Phase

The operational phase of the Project will result in the generation of limited waste streams from operation & maintenance activities, with the vast majority of waste likely to be non-hazardous.

Nevertheless, if these waste streams are not managed and disposed of effectively, they could result in significant impacts upon the surrounding environment (e.g., soil and groundwater resources, attraction of pests, nuisance odour etc.).

#### 13.3.2.1 Solid Waste

Solid waste is not expected to be generated in significant quantities during the operational phase of the wind farm besides maintenance for transformers, and general day-to-day maintenance activities of administration facilities.

##### NON-HAZARDOUS SOLID WASTE

The operation of the Project will generate small amounts of non-hazardous domestic waste from the operation of the administration facilities and from activities of the employees.

This waste can be classified as both recyclable and non-recyclable. Recyclable waste includes paper, tin cans, plastics, cartons, rubber, and glass, while non-recyclables will consist mainly of food residues and other organic wastes.

The quantity of domestic waste will be small given the few anticipated personnel required to operate the Project. Other solid non-hazardous waste generated during operation will be any landscaping wastes and uncontaminated replacement parts and packaging. Replacement of significant component of the wind turbines such as blades, nacelle and associated electrical components may be required in the event of major failure. However, such components are expected to be returned to the turbine supplier for repair or recycling.

##### HAZARDOUS SOLID WASTE

This fraction of the waste streams can potentially cause significant adverse impacts on human health and the environment if inadequately managed. However, only very small quantities of hazardous materials (and waste) are expected during the operational phase of the Project.

Examples of possible hazardous waste streams that may arise during the operation of the Project include the following:

- Used chemical containers and drums;
- Soil contaminated by potential spills and leaks of hazardous materials/liquids and used spill kits and clean up materials;

- Miscellaneous wastes such as waste cables, oily rags, etc.;
- General clean-up materials and solvents from general maintenance of on-site plant and machinery; and
- Electrical waste (spare parts, obsolete equipment) – specific to the OHTL

Inappropriate handling of hazardous waste streams through lack of personnel training on site may lead to accidental release of hazardous waste contaminating soil or groundwater. Contamination may also arise as a result of poor-quality waste transporters and waste management facilities, or lacking capacity of these services locally. These risks may consequently result in illicit waste disposals (e.g., fly-tipping, or waste disposal at unlicensed locations), or the engagement of unlicensed contractors/facilities).

### 13.3.2.2 Wastewater

Liquid waste generated from operational activities will include the following:

- Sanitary and domestic wastewater generation from operation and maintenance staff;
- Oily Water (to collect spills/leaks from transformer areas) will be in very small quantities; and
- Liquid hazardous waste (if any) such as fuels, chemicals, paints, lubricants, solvents, waste oil, hydraulic fluid, resins, waste solvents and thinners, etc.

Sanitary and domestic wastewater will be generated directly from site toilets and kitchen facilities and will make up the majority of operational wastewater. All sanitary streams will be directed to the septic tank for collection and disposal by a licensed contractor, likely to a facility in Nukus.

Any oily wastes from the transformer area, or other floor drains in oily areas, will collect oily water in a sump and will be treated in an oil separator for settlement of solids. The residual oil and solids will be collected for recycling and/or disposal by a licensed contractor.

The improper handling, transport and disposal of hazardous wastes could lead to potential localised contamination of soil and groundwater resources, which have been assessed for significance in the Geology, Soils and Groundwater Chapter of this report.

### 13.3.3 Decommissioning Phase

The waste during the decommissioning phase will be similar to that of the construction phase, however, it is expected that components of the Project, such as turbine blades, will be sent back to the manufacturer for reuse or recycling.



During decommissioning of the Project, there is a potential for inert demolition waste and materials such as steel reinforced bars, broken concrete, cabling, transformer oils etc. to contaminate soils. The decommissioning of the wind farm provides significant opportunity for resource efficiency and material re-use/recovery/recycling. As such, a Decommissioning Plan will be developed to include detailed methods for re-use, recovery, recycling, removal and finally disposal of decommissioning wastes.

## 13.4 Mitigation and Management Measures

### 13.4.1 Waste Characterisation

Waste can exhibit certain characteristics according to the process stream from which it is generated and any pre-treatment processes that are undertaken. Different types of waste require different management and disposal techniques according to the potential risk that the material poses to human health or the environment. For this Project, waste has been classified into the three main categories in the following table.

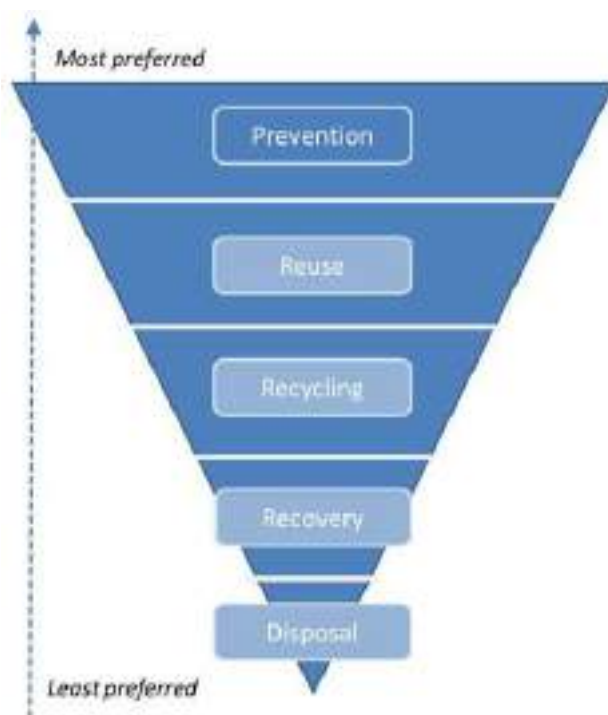
**Table 13-1 Waste Characterisation**

WASTE CLASSIFICATION	DESCRIPTION
<b>Domestic Waste</b>	Wastes such as organic wastes, paper, cardboard, plastic, cans, etc. Disposal of such waste can generally be routed to municipal recycling or disposal facilities.
<b>Industrial Waste</b>	Non-hazardous wastes that have physical and chemical characteristics that are different from domestic wastes such as construction waste, glass, scrap metal, wood, used containers, tyres etc. This waste generally poses little risk to the environment and can be disposed to normal municipal facilities after waste minimisation options are exhausted and before obtaining approval.
<b>Hazardous Waste</b>	Waste is classified as being hazardous because of its concentration; physical, chemical or infectious characteristics, which may pose a present or potential threat to human health or the environment and/or may cause an increase in serious irreversible or incapacitating reversible illness or contribute to an increase in mortality. Hazardous wastes must be segregated, stored, transported and ultimately treated and disposed of by an approved waste services provider.

### 13.4.2 Waste Management Hierarchy

The waste management hierarchy illustrates good practice for waste management considerations by ensuring consideration of the most sustainable available application for waste management in preference of disposal and eventual contribution to adverse environmental and economic impacts associated with landfill. The hierarchy, as illustrated in the following graphic, should form a key element of any waste management strategy and if

implemented effectively will achieve maximum reductions on waste quantities combined with the limited use of resources and fill space. The waste management hierarchy also has the potential to reduce costs that may be incurred by the EPC Contractor or the proponent for handling, transportation and the disposal of waste.



**Figure 13-2 Waste Management Hierarchy (UNEP, 2011)**

Initially, options to prevent or reduce waste should be considered. Where waste generation cannot be avoided or further reduced at source, opportunities for reuse of materials should be explored, either for use for the same or a different purpose. Disposal to landfill is the least favoured option in the waste hierarchy and is the last resort after all other options have been considered.

### 13.4.3 Construction Phase

**Table 13-2 Waste and Wastewater Construction Phase Mitigation and Management Measures**

IMPACT/SOURCE	MITIGATION AND MANAGEMENT MEASURES
Inappropriate handling, storage, transport and disposal of solid non-hazardous waste	<ul style="list-style-type: none"> <li>The EPC Contractor will develop and implement a Project-specific Construction Waste Management Plan (CWMP) in line with committed mitigation measures in this ESIA report and the provisions of the CESMP.</li> <li>The EPC Contractor will identify the most suitable waste management facility to dispose of the generated wastes.</li> <li>The EPC Contractor will identify recycling companies in the region in order to promote the recycling of waste especially packaging materials, wood and metal waste etc.</li> </ul>

IMPACT/SOURCE	MITIGATION AND MANAGEMENT MEASURES
	<ul style="list-style-type: none"> <li>Domestic solid waste will be segregated and identified from the other waste streams into separate waste containers/skips clearly to facilitate recycling and reuse.</li> <li>Waste containers/skips will be clearly labeled and placed in designated waste storage locations. Labels will be waterproof, securely attached, and written in English and other languages (such as Uzbek and Russian) as required for the workforce.</li> <li>For litter (food waste, domestic waste), an adequate number of covered bins will be strategically placed throughout the site at locations where construction workers and staff consume food. These will be regularly collected and taken to the main waste storage area.</li> <li>Food waste will be stored within a sealed metal or plastic skip or bin, in order to prevent pests gaining access.</li> <li>On-going housekeeping training will be provided to all staff on the importance of the need to avoid littering.</li> <li>Heavy waste may be contained within an open skip, provided that segregation occurs effectively enough to remove all lightweight material that could be blown away.</li> <li>Waste generated during construction will be recycled and reused until reduced to as low as practicable prior to collection for disposal by an appropriately licensed waste contractor.</li> <li>Only licensed waste transporters and waste management facilities will be engaged.</li> <li>A waste inventory will be developed and maintained to document and track domestic solid wastes generated, segregated, reused and consignments</li> <li>Completed waste manifests will be required to show the chain of custody of the waste generated on site, its transportation and treatment/disposal. All records will be maintained on site.</li> <li>All employees will attend a mandatory training program to increase their awareness of waste management protocols including proper handling and storage of waste, recycling waste, reusing plastics, rebar, wood &amp; other reusable non-hazardous materials.</li> </ul>
Inappropriate/un controlled handling, storage, transport and/or disposal of solid hazardous waste	<ul style="list-style-type: none"> <li>The EPC Contractor will identify a suitable facility to handle the hazardous wastes.</li> <li>A hazardous waste inventory will be developed and maintained to document and track hazardous wastes generated, segregated, reused and consignments.</li> <li>Hazardous wastes will be identified and segregated from the other waste streams into separate labeled waste containers/skips.</li> <li>Hazardous wastes will be stored in allocated impervious hard standing areas in sealed containers stored with impermeable bases, sufficient containment and separation capacity, sun/rain shelter, separate drainage system, good ventilation and equipped with spill kits &amp; spill response procedures. This area must be placed away from any sources of ignition.</li> <li>Hazardous waste storage areas will be constructed away from drainage system and a rain shelter will be provided to avoid any potential instance of runoff, or leakage of runoff.</li> <li>Waste containers will be clearly marked with appropriate warning labels to accurately describe their contents and detailed safety precautions. Labels will be waterproof, securely attached, and written in English and</li> </ul>

IMPACT/SOURCE	MITIGATION AND MANAGEMENT MEASURES
	<p>other languages as required for the workforce (such as Uzbek and Russian). Wherever possible, chemicals will be kept in their original container.</p> <ul style="list-style-type: none"> <li>• Hazardous waste storage areas will be located away from any ignition sources or fire hazards.</li> <li>• Used face masks will be stored in designated bins and disposed of as medical waste.</li> </ul>
Inappropriate/uncontrolled handling, storage, transport and/or disposal of sanitary wastewater	<ul style="list-style-type: none"> <li>• The EPC Contractor will develop and implement a Project-specific Construction Waste Management Plan (CWMP) in accordance with committed mitigations measures in this ESIA report and provisions of the CESMP.</li> <li>• The EPC Contractor will identify a suitable wastewater treatment facility for disposal of wastewater and identify a licensed wastewater contractor for the periodic removal of wastewater.</li> <li>• A hazardous waste inventory will be developed and maintained to document and track sanitary waste generated and segregated.</li> <li>• Sanitary wastewater tanks will be placed in allocated impervious hard standing areas with bonding capacity to hold 110% volume of the maximum volume stored.</li> <li>• Sanitary wastewater tanks to be properly maintained and inspected to ensure tanks do not overflow.</li> <li>• Site inspections will be carried out regularly by the EPC contractor to ensure that all wastewater generated is properly managed, and no leakages or spill occur. In the event of a spill or overflow, immediate action will be taken in accordance with spill containment procedures and clean up procedures (to be developed in line with the CESMP).</li> <li>• In common with the IFC EHS Guidelines, effort will be made in training construction personnel to minimise water consumption for ablutions and to ensure an understanding of water resource and wastewater issues.</li> </ul>
Inappropriate handling and disposal of contaminated soil from clearing and excavation works causing cross-contamination of soils	<ul style="list-style-type: none"> <li>• The construction workforce will receive training enabling them to be able to identify signs of potential contamination (e.g., smell of hydrocarbons, staining).</li> <li>• If contamination is found, a Contaminated Soil Management Plan will be developed and implemented to ensure appropriate handling, treatment and disposal of soil</li> </ul>
Inappropriate handling of concrete washout	<ul style="list-style-type: none"> <li>• Concrete washout will only be undertaken in designated and signed areas to prevent leaks or spread of wastewater.</li> <li>• The concrete washout area will be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.</li> <li>• The concrete washout area will have an impermeable surface with dedicated drainage systems that lead to separate sumps or treatment facility.</li> <li>• The removal of any sludge residues as solid hazardous waste will be undertaken by a licensed waste contractor and handled as a hazardous waste.</li> </ul>
Medical Waste	<ul style="list-style-type: none"> <li>• Any generated medical waste (e.g., from on-site clinics) shall be stored in appropriate medical waste containers.</li> <li>• All medical waste shall only be handled by trained personnel.</li> </ul>

IMPACT/SOURCE	MITIGATION AND MANAGEMENT MEASURES
	<ul style="list-style-type: none"> <li>The removal of any medical waste from the site for appropriate treatment, disposal/incineration will only be conducted by a licensed contractor.</li> </ul>

#### 13.4.4 Operation Phase

**Table 13-3 Waste and Wastewater Operation Phase Mitigation and Management Measures**

SOURCE	MITIGATION AND MANAGEMENT MEASURES
Inappropriate handling, storage, transport and disposal of non-hazardous solid waste	<ul style="list-style-type: none"> <li>The O&amp;M Company will develop and implement a Project-specific Operational Waste Management Plan (OWMP) in line with committed mitigation measures in this ESIA report and the provisions of the OESMP.</li> <li>Domestic solid wastes to be segregated and identified from the other waste streams into separate waste containers/skips clearly to facilitate recycling.</li> <li>Waste containers/skips should be clearly labeled and placed in designated waste storage locations. Labels will be waterproof, securely attached, and written in English and other languages as required for the workforce such as Uzbek and Russian.</li> <li>For litter (food waste, domestic waste), an adequate number of covered bins should be strategically placed throughout the site at locations where construction workers and staff consume food. These will be regularly collected and taken to the main waste storage area.</li> <li>Food waste must be stored within a sealed metal or plastic skip or bin, in order to prevent pests gaining access.</li> <li>Heavy waste may be contained within an open skip, provided that segregation occurs effectively enough to remove all lightweight material that could be blown away.</li> <li>Paper cardboard, metal cans, plastic, glass to be collected for recycling by a licensed waste contractor.</li> <li>Only licensed waste transporters and waste management facilities will be engaged.</li> <li>The Contractor will maintain copies of the waste management licensed on site.</li> <li>Develop and maintain a waste inventory to document and track domestic solid wastes generated, segregated, reused and consignments</li> <li>Completed waste manifests are required to show the chain of custody of the waste generated on site, its transportation and treatment/disposal. All records will be maintained on site.</li> </ul>
Inappropriate/uncontrolled handling, storage, transport and/or disposal of sanitary wastewater	<ul style="list-style-type: none"> <li>Sanitary facilities should be provided with adequately designed underground storage tanks.</li> <li>Sanitary wastewater tanks to be properly maintained and inspected to ensure tanks do not overflow.</li> <li>Sanitary wastewater tanks in allocated impervious hard standing areas with bunding capacity of 110% volume of the maximum volume stored.</li> <li>Sanitary wastewater treated at the onsite sewage treatment plant must meet established limit for landscaping.</li> <li>Where there are no onsite sewage treatment plant, a licensed waste contractor will be engaged for the periodic removal of tank.</li> </ul>

SOURCE	MITIGATION AND MANAGEMENT MEASURES
Inappropriate/un controlled handling, storage, transport and/or disposal of solid hazardous waste	<ul style="list-style-type: none"> <li>Develop and maintain a hazardous waste inventory to document and track hazardous wastes generated, segregated, reused and consignments.</li> <li>Segregate and identify hazardous waste from the other waste streams into separate waste containers/skips clearly signed and labelled.</li> <li>Store hazardous waste in allocated impervious hard standing areas in sealed containers stored with impermeable bases, sufficient containment and separation capacity, sun/rain shelter, separate drainage system, good ventilation and equipped with spill kits &amp; spill response procedures. This area must be placed away from any sources of ignition.</li> <li>Waste containers should be clearly marked with appropriate warning labels to accurately describe their contents and detailed safety precautions. Labels will be waterproof, securely attached, and written in English and other languages as required by the workforce such as Uzbek &amp; Russian. Wherever possible, chemicals will be kept in their original container.</li> <li>Used face masks shall be stored in designated bins and disposed off as medical waste.</li> </ul>

## 13.5 Monitoring

The following table outlines the proposed monitoring for waste and wastewater impacts.

**Table 13-4 Waste and Wastewater Monitoring Requirements**

MONITORING	PARAMETER	FREQUENCY & DURATIONS	MONITORING LOCATION
Inspect and monitor proper handling and storing of waste materials	Check storage areas containment and control procedures as per CESMP/OESMP	Daily	Storage areas at the site
Inspect and monitor third party waste contractors and disposal facilities	Ensuring engaged contractors, their vehicles and waste management facilities have applicable registrations/licenses at time of procurement	At procurement and annually thereafter	Contractors, transport vehicles and waste management facilities
Waste Transfers	Record keeping of waste transfer notes	On-going	As waste is transferred during construction and operational phases.



## 14 TRAFFIC AND TRANSPORTATION

### 14.1 Applicable Requirements & Standards

#### 14.1.1 National Regulations

The Ministry of Transportation is responsible for all transport related activities and their requirements should be fully complied with in terms of routing of HGVs and site vehicles, licensing, road diversions, heavy/wide loads etc. Some of the relevant national requirements for the Project include:

- Law “About traffic safety” of the Republic of Uzbekistan August 19, 1999 No. 818-I (as amended on 29-12-2015): The main objective of this law is to ensure protection of life and health of citizens and their protection.
- Regulations on road safety during transportation of large and heavy loads by road transport (Annex No.2 to the Decree of Cabinet of Ministers No. 342 of December 26, 2011): This law determines the requirements of ensuring and coordinating traffic safety during the transportation of large size and heavy loads on public roads on the territory of Uzbekistan. It also details the basic requirements for the technical condition equipment and furnishing of vehicles used for the transport of large and heavy loads as well as safety.
- Criteria and Procedure for Determining International Road Transportation of Loads (approved by the Decree of Ministry of Transport of the Republic of Uzbekistan and State Customs Committee of the Republic of Uzbekistan dated October 31, 2019, No. 6).
- Regulations on transport of loads by road in the Republic of Uzbekistan (Annex to Decree of Cabinet of Ministers No. 213 of 01.08.2014)

#### 14.1.2 Lender Requirements

##### **EBRD**

The EBRD PR 4 on Health and Safety establishes management requirements with regards to traffic and road safety risks to workers and potentially affected communities. Relevant EU road and traffic safety management standards must therefore be taken into consideration.

*“For Projects that operate moving equipment on public roads and other forms of infrastructure, the client will seek to prevent the occurrence of incidents and injuries to members of the public associated with operation of such equipment.”*

## EPFIs

The assessment will be undertaken with due consideration of the recommendations set out within the IFC/World Bank General EHS Guidelines (2007) Section 3.4 Traffic Safety, within Section 3: Community Health and Safety.

Separate considerations regarding Community Health and Safety are also provided in the IFC EHS Guideline for Wind Energy (2015). This includes relevant items for 'Abnormal Load Transportation'.

### 14.1.3 Transportation of WTG Components to Site

Transportation route surveys were undertaken by ACWA Power in August 2021 for the transportation of the heavy project components (blade, nacelle, hub etc.).

The survey was undertaken between sites in China (Bameng, Eerduosi and Hami) to Dulata, Khorgos or Alanshankhou borders in China and from either of these borders to custom points at Nur Zholy / Kolzhat crossing on the China – Kazakhstan border. From Nur Zholy / Kolzhat, project components will be transported to custom points at Yallama (on the Kazakhstan – Uzbekistan border) and onwards towards the Project site.

Numerous obstacles were recorded along the route from the Nur Zholy / Kolzhat crossing to Yallama including toll gates, railway crossings, bridges (pedestrian, railway, road), arches, and OHTL.

Figure 13-2 shows the transportation route surveyed from Yallama to Karatau, a distance of approximately 1010 km.

The M39 road will be used for the initial stage of the journey toward Karmana, the route then continues along the A380 via Bukhara, Gazli, Turtkul and Beruni.

The A380 that runs in a northwest/south-east direction west of the Project site is an international road that runs between the cities of Nukus and Bukhara. The roadway along the section that runs parallel to the site is in poor condition with numerous potholes and cut-outs. The road will require substantial rehabilitation and maintenance. The road is also frequently used by HGVs passing to and from the industrial facilities in the area. There is also a freight railway line that runs adjacent to sections of the A380 closest to the site. There are no airfields or airports within 50 km of the site, however, there are two (2) helipads next to the vermiculite mining facilities, as shown in the following figure.



**Figure 14-1 Helipads next to Mining Facility**

The EPC Contractor and the different suppliers will be required to adhere to the custom procedures in the countries of origin, transit (Kazakhstan) and in Uzbekistan as applicable. Additional road surveys are expected to be undertaken before the commencement of delivery of Project equipment, machinery and materials.

#### **CONSULTATIONS**

Based on 5 Capitals' experience on wind projects in Uzbekistan and previous consultation with the Ministry of Transportation it is understood that the Project will be required to secure a special permit for the transportation of bulky and heavy cargo in accordance with the regulation "*Ensuring traffic safety during the transportation of bulky and heavy cargo*", approved by the Cabinet of Ministers of the Republic of Uzbekistan No.342 dated December 26, 2011.

In addition, a consultation letter was sent to the Main Department of Highways of The Republic of Karakalpakstan, who responded on 04 April 2022 and stated that they had no objections.

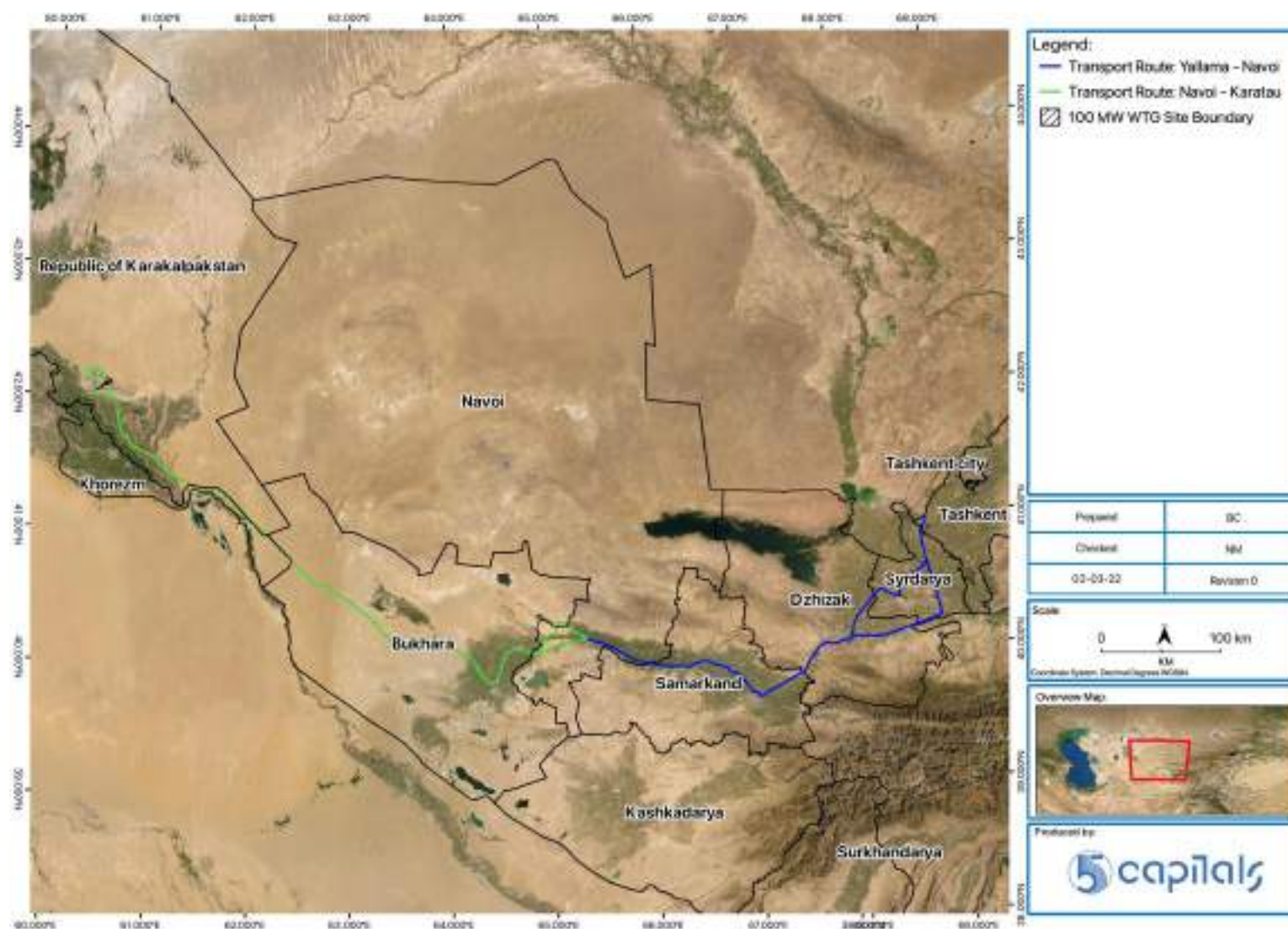


Figure 14-2 Transport Survey Route

## 14.2 Area of Influence and Receptors

### 14.2.1 Area of Influence

The area of influence for traffic and transportation impacts is along the whole route from WTG component/equipment manufacture to the site.

### 14.2.2 Receptors

**Table 14-1 Receptor Sensitivity to Traffic and Transportation Impacts**

RECEPTOR	SENSITIVITY	JUSTIFICATION
Road users along transport route of WTG components	Low	As per the transport route survey report, the components will typically travel on highways and any interaction with residential areas will be rare.  Traffic impacts were not reported in the route survey, nor were they noted on the site visit and therefore the roads are determined to have adequate carrying capacity.

## 14.3 Potential Impacts, Mitigation, Management & Residual Impacts

### 14.3.1 Construction Phase

The major components for the construction of the wind farm are the turbine components (blades, heavy turbine tower sections, transformers, nacelle, etc.) that can only be assembled at the site and as such they have to be transported to the site individually. Such turbine components are likely to be transported by specialised turbine transportation vehicles.

It is understood from the route survey that all turbine components will be transported by road from China, through Kazakhstan and then across the Kazakhstan – Uzbekistan border and to the site. The transportation route survey report indicates that the current road infrastructure has limitations which may hinder the transportation of the Project materials.

If the routes are not carefully planned, the trailers hauling heavy components may potentially damage or cause structural damage on the existing highways, on bridges, signage, or on utilities such as electricity and drainage infrastructure.

The transportation route surveys had identified sections of roads which will require upgrades and maintenance in order to be suitable for the transportation of the WTG components.



A detailed assessment of impact upon road and transport infrastructure is not within the scope of this ESIA, nor is assigning a sensitivity to the existing road infrastructure, however, further details are available within the transport route surveys.

The primary traffic and transportation impact assessed within this ESIA relates to traffic impacts to local populations and road users. Impacts to community safety are assessed within Chapter 17 – Community Health, Safety and Security.

#### **14.3.1.1 Traffic Impacts**

Construction activities including the transportation of WTG components, construction materials and project staff will require an increase in vehicular flow on roads and highways and this will likely result in road traffic increases.

Findings from the transport survey and numerous site visits undertaken till date indicates that the highways and local road infrastructure are operating below their respective design capacity and as such have sufficient capacity for increase in traffic flow and will not be significantly impacted by vehicles carrying normal loads.

Although the highway infrastructure has sufficient capacity for increase in traffic flow, the movement of specialised turbine transportation vehicles will likely require temporary road closures and diversions and this will result in disruption, delay and in some instances traffic congestion to road users.

There are numerous industrial facilities close to the Project site and therefore movements of HGV are common in the area, if traffic is not managed and if there is not clear communication with the industrial facilities then there is the potential for congestion issues. In addition, there is a railway line that requires crossing to access the site and therefore timings of train movements need to be known.

It is important to note that the route survey report indicates that the route does not pass residential areas but rather is limited to along major highways. This is also the case close to the Project site where the lack of residential receptors is noted.

A final Route Survey Report and an associated Traffic and Transportation Management Plan will be required. The plan will be prepared in accordance with IFC General EHS Guidelines, and will outline how turbine components will be delivered to the site and how construction traffic will be managed to limit impacts upon other road users, construction personnel and any local communities.



The plan will include information on the permits required for transport, the designated access routes, site entrance points, speed limits, waiting, parking areas and map out accident and traffic hotspots for project access vehicles.

Prior to mitigation impacts are expected to be temporary, localised and reversible and therefore of minor magnitude. Following implementation of the proposed mitigation and the implementation of a site-specific Traffic and Transportation Management Plan impacts are not deemed to be significant.

**Table 14-2 Traffic and Transportation Impact Significance, Mitigation Measures and Residual Impacts**

POTENTIAL IMPACT	MAGNITUDE	RECEPTOR	SENSITIVITY	POTENTIAL IMPACT SIGNIFICANCE	MITIGATION AND MANAGEMENT MEASURES	RESIDUAL IMPACT
<b>Construction</b>						
Traffic Impacts	<b>Minor Negative</b>	Road users along transport route of WTG components	<b>Low</b>	<b>Minor</b>	<ul style="list-style-type: none"> <li>A final route survey report will be completed.</li> <li>The conclusions and recommendations of the Route Survey report such as sections of the road that will require to be upgraded, need for electricity shutdown etc. will be implemented</li> <li>Preparation and implementation of a Traffic and Transportation Management Plan. The plan will be prepared in accordance with IFC General EHS Guidelines, and will outline how turbine components will be delivered to the site and how construction traffic will be managed to limit impacts upon other road users, construction personnel and any local communities.</li> <li>The Plan will include information on the permits required for transport, the designated access routes, site entrance points, speed limits, waiting, parking areas and map out accident and traffic hotspots for project access vehicles.</li> <li>The local police and other relevant authorities will be consulted during the development of the Plan.</li> <li>Transportation of materials over railroad crossing must be organised according to the train schedule and coordinated with relevant authorities as required by law.</li> <li>Final road condition of the selected transportation route will be checked before transportation of any oversized loads to determine that the required improvements have been put in place.</li> <li>Where transportation of equipment/materials is to be undertaken during the winter season or on wet or windy periods, additional safety and precaution measures will be implemented in order to ensure the safety of other road users and integrity of the road infrastructure and materials being transported.</li> <li>Ensure that any equipment/materials transported across border crossings meet all the legal requirements including those relating to customs.</li> <li>Construction access road into the site will be clearly signposted.</li> <li>Buses will be used to transport the construction workforce and carpooling among staff will be encouraged.</li> <li>Route directions and speeds limit will be placed along the access road into the project site in relevant local languages.</li> <li>Deliveries of construction materials will be coordinated to reduce congestion on local roads and to reduce the waiting time for the drivers.</li> </ul>	<b>Negligible</b>

POTENTIAL IMPACT	MAGNITUDE	RECEPTOR	SENSITIVITY	POTENTIAL IMPACT SIGNIFICANCE	MITIGATION AND MANAGEMENT MEASURES	RESIDUAL IMPACT
					<ul style="list-style-type: none"> <li>Where applicable, the EPC Contractor will obtain the relevant permits to transport heavy loads into the project site and adhere to the stipulated conditions (i.e. delivery routes and timings).</li> <li>Where applicable, the EPC Contractor will notify the local communities on delivery of wide/heavy loads and how it could potentially impact their road use.</li> <li>Road closures and diversions as a result of project component transportation will be kept to a minimum and wherever practicable peak transportation hours must be avoided to reduce impacts on commuters &amp; road user.</li> <li>Oversize &amp; heavy load vehicle's drivers will be competent and legally authorised to operate such vehicles in the Uzbekistan and across borders where applicable.</li> <li>The EPC Contractor will provide awareness training on traffic safety to the local people in collaboration with local police office.</li> <li>All traffic incidents and near misses will be recorded and investigated with any necessary corrective actions taken including reporting to local police.</li> <li>A grievance mechanism will be established to allow local road users and communities to make complaints relating to Project traffic and transportation.</li> <li>Compensation of any livestock injured by Project vehicles will be conducted in coordination with community leaders and local officials.</li> <li>Project drivers will not be permitted to transport any unauthorised personnel or goods.</li> </ul>	

## 14.4 Monitoring

The final monitoring methodology with specific monitoring details (i.e. locations etc.) will be developed in the specific 'Environmental and Social Monitoring Plan'. The monitoring requirements below relate to construction phase and no specific monitoring requirements are proposed for the operational phase.

**Table 14-3 Traffic and Transportation Monitoring Requirements**

MONITORING	PARAMETER	FREQUENCY & DURATIONS	MONITORING LOCATION
Safety of drivers, residents and local herders in the Project area	Record keeping in case of accidents or incidents. Incidents involving livestock and wildlife will also be recorded.	Daily	Roads used by the Project vehicles
Grievances received	Record of grievances received, response period, close-outs	On-going	Roads used by Project vehicles
Permits & licenses	Validity and renewal of permits & licenses	As required by law	Document control office – EPC Contractor

## 15 ARCHAEOLOGY AND CULTURAL HERITAGE

### 15.1 Applicable Requirements & Standards

#### 15.1.1 National Regulations

The Ministry of Culture of the Republic of Uzbekistan is responsible for preserving, developing and promoting the cultural wealth and the national tourism attractions of the nations, nationalities and peoples of Uzbekistan.

Relevant legislation in Uzbekistan relating to archaeology and cultural heritage include:

- Constitution of the Republic of Uzbekistan (2017) states that it is the duty of every citizen to protect the historical, spiritual and cultural heritage of the people of Uzbekistan. Furthermore, cultural moments are to be protected by the state.
- The Law of the Republic of Uzbekistan № 269-II dated August 2001 "On the protection and use of the sites and objects of cultural heritage."
- Resolution of the President of the Republic of Uzbekistan № RP-4068 dated December 19, 2018 "On measures for improving actions for protection of material cultural heritage objects."
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan № 846 dated October 4, 2019 "On approval of the national list of real state sites and objects of material cultural heritage."
- Criminal Code of the Republic of Uzbekistan (1994 amended in 2002). Article 132 states that fines for intentional destruction or damage of objects of cultural heritage under state protection causing significant or major damage will be imposed.

The above laws seek to protect and sites and objects of cultural heritage which are considered as part of the national heritage for all the people in Uzbekistan.

#### 15.1.2 Lender Requirements

##### **EBRD**

EBRD Performance Requirement 8 recognises the importance of cultural heritage, both tangible and intangible for present and future generations. The aim is to protect cultural heritage and to guide clients in avoiding or mitigating adverse impacts on cultural heritage in the course of their business operations. The clients are expected to be precautionary in their approach to the management and sustainable use of cultural heritage.

##### **EPFIs**

In accordance with the Equator Principles, the assessment will refer to applicable IFC Performance Standards on Social and Environmental Sustainability, specifically with due

consideration of Performance Standard 8 – Cultural Heritage. PS8 aims to protect the adverse impacts of project activities and support its preservation and to promote equitable sharing of benefits from the use of cultural heritage.

IFC Performance Standard 8 on Cultural Heritage recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that clients protect cultural heritage in the course of their project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity. Its aim is to protect the adverse impacts of project activities and support its preservation and to promote equitable sharing of benefits from the use of cultural heritage.

Cultural heritage in this standard refers to:

- Tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values;
- Unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls; and
- Certain instances of intangible forms of culture that are proposed to be used for commercial purposes, such as cultural knowledge, innovations, and practices of communities embodying traditional lifestyles.

## 15.2 Baseline Conditions

### 15.2.1 Cultural Heritage

There are two cultural heritage sites within 45 km of the wind farm site boundary, their locations relative to the Project are shown in the Figure 15-3. The sites were identified via desktop review and review of the ESA report.

Chilpak Kala (C-1), located just over 40 km from the closest WTG, is a round roofless tower, 15 m high and 65 m in diameter, built at the top of a rounded natural hill. The Zoroastrian monument is more than 2,200 years old and was a place to take the dead to allow their bodies to be scavenged by vultures. Recently, steps have been constructed up to the base of the monument to assist tourists visiting the site and two yurts are located at the bottom of the hill for ceremonies and other activities. In days of good visibility, the monument offers excellent panoramic view of the surroundings, including views to the Karatau hills, behind which the Project is situated. As stated in the Landscape and Visual Amenity Chapter, it is feasible that the Project is visible from this location, although it is 40 km from the nearest turbine.





**Figure 15-1 Chilpak Kala**

The Sultan Uwais Baba Complex (C-2) is a collection of buildings and graveyards approximately 10 km away from the nearest WTG. The shrine to Sultan Uwais Baba is one of the most sacred places in Karakalpakstan and is a popular place of pilgrimage amongst the people of Karakalpakstan and Khorezm. As stated in the Landscape and Visual Amenity section of this scoping report, it is feasible that blade tips would be visible from certain locations within the Complex, although not the main visitor centre.



**Figure 15-2 The Sultan Uwais Baba Complex**

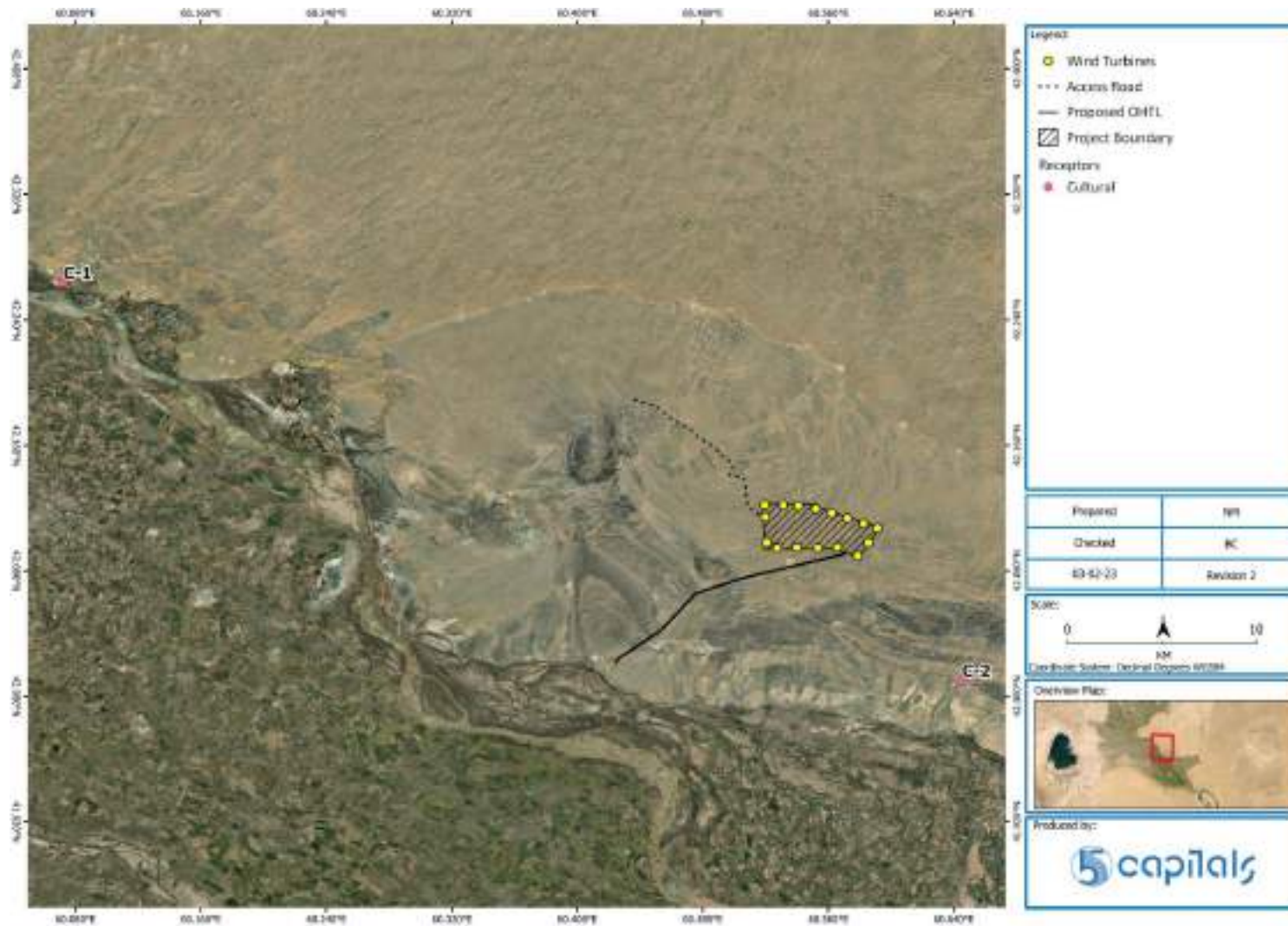


Figure 15-3 Cultural Sites

## 15.2.2 Intangible Cultural Heritage

In Uzbekistan, the inclusion of objects/elements of intangible cultural heritage is undertaken by the Ministry of Cultural Heritage based on proposals from local state bodies, legal entities and individuals. Currently, Uzbekistan has 10 elements of intangible cultural heritage listed by UNESCO, these are provided in the following table.

**Table 15-1 Intangible Cultural Heritage of Uzbekistan**

ELEMENT	DESCRIPTION (SUMMARY)	REGION WHERE IT IS COMMONLY PRACTICED
Bakshi art (2021)	Bashki refers to the performance of traditional centuries old poems based on myths, legends, folk tales and legendary chants with the accompaniment of musical instruments including dombra and kobuz. The practice is passed on within families of through formal bakhshi schools.	Republic of Karakalpakstan, Surkhandarya region
Khorazm dance, Lagzi (2019)	This dance reflects the sound and phenomena of surrounding nature, feelings of love and happiness. Lagzi is transmitted across generations through creation of new versions of performances. It is performed through national holidays and folk festivities as well as in the daily-based interpretation during family events.	Mainly in the Khorazm Region but it has also spread to other regions in Uzbekistan.
Art of miniature (2020)	Type of two-dimensional artwork that involves the design and creation of small paintings on books, papier mache, rugs, textiles, walls, ceramics etc. The patterns art represents beliefs, world views and lifestyles in a pictorial fashion and has also been influenced by Islam.	Bukhara region and Samarkand region
Margilan Crafts Development Center, safeguarding of the atlas and adras making traditional technologies (2017)	Historically, Margilan was the centre for making atlas and adras – vivid and fine traditional fabrics. The goal of the Center is to safeguard, develop and promote the method of Uzbek traditional atlas and adras through innovative training, exhibitions etc.	Ferghana Valley in Uzbekistan, Margilan city
Nawrouz, Novruz, Nowrouz, Nowrouz, Nawrouz, Nauryz, Nooruz, Nowruz, Navruz, Nevruz, Nowruz, Navruz (2016)	This marks the beginning of new year on 21 <sup>st</sup> March when a variety of rituals, ceremonies and other cultural events take place for a period of about two weeks. It includes spending time with family, friends, exchanging gifts, street performances, public rituals, traditional sports etc.	Across Uzbekistan

ELEMENT	DESCRIPTION (SUMMARY)	REGION WHERE IT IS COMMONLY PRACTICED
	These practices are transmitted from older to younger generations through observation and participation.	
Palov culture and tradition (2016)	<p>Polav is a traditional dish made and shared throughout rural and urban communities across Uzbekistan. It is served as a gesture of hospitality, to celebrate special occasions such as weddings and new year.</p> <p>Knowledge and skills associated with the practice are handed down from older to younger generations formally and informally using a master-apprentice model or by demonstration within families, peer groups or community organisations.</p>	Across Uzbekistan
Askiya, the art of wit (2014)	<p>A genre of Uzbek verbal folk art that takes the form of a dialogue between two or more participants who eloquently debate and exchange witticisms around a particular theme. The bearers and practitioners (mainly men) must master the peculiarities of Uzbek language and be skilful and humorous.</p> <p>At present there are more than 30 forms of Askiya some professionals and other amateurs.</p>	Ferghana Valley in Uzbekistan and Tashkent region
Katta Ashula (2009)	<p>A type of traditional song that forms part of the identity of various people of the Ferghana valley in Uzbekistan.</p> <p>It is transmitted orally from master to pupil from one generation to another during a demanding apprenticeship and it is interpreted by a minimum of two and a maximum of five singers.</p>	Ferghana Valley in Uzbekistan
Cultural space of Boysun District (2008)	<p>Boysun district is located in south-eastern Uzbekistan on the route from Asia to Minor India and is one of the oldest inhabited areas of Central Asia. Numerous traditions and rituals are still present here.</p> <p>Ancient practices are used of conduct wedding ceremonies, funeral rights, shamanistic rituals etc. Other popular traditions are ritual chants linked to annual festivals, epic legends &amp; dances.</p>	Surkhandarya region
Shashmaqom music (2008)	<p>Shashmaqom means “six maqoms” and constitutes a fusion of vocals and instrumental music, melodic and rhythmic idioms and poetry.</p> <p>It dates back to pre-Islamic era and is continuously influenced by developments</p>	Uzbekistan, Tajikistan and may have developed in Bukhara City

ELEMENT	DESCRIPTION (SUMMARY)	REGION WHERE IT IS COMMONLY PRACTICED
	<p>in musicology, poetry, mathematics and sufism.</p> <p>Numerous schools were founded by Jewish communities in the ninth and tenth centuries especially in the city of Bukhara, the historical and spiritual centre of Shashmaqom.</p> <p>Oral transmission from master to student remains the principle means of preserving the music and its spiritual values.</p> <p>From the 1970s, many of the best-known Shashmaqom performers emigrated from Uzbekistan to the diaspora communities in Israel and the United States. With the passing of many Shashmaqom masters, the overwhelming majority of present-day performers in Uzbekistan are graduates of the Tashkent Conservatory, which offers training in Shashmaqom composition.</p>	

It is not expected that the Project will have any impact, or result in the dilution of any intangible cultural heritage practices, this is due to the relatively low requirement for Project workforce (during both the construction and operation phases) and the distances between the Project and the practice of the aforementioned intangible heritage.




### 15.2.3 Archaeology

Consultations were conducted with the Institute of Archaeology of Uzbekistan Academy of Sciences and the Karakalpak Research Institute of the Humanitarian Sciences of the Karakalpak Branch of the Academy of Sciences of the Republic of Uzbekistan on March 4, 2022, at 11:00 (Tashkent time).

Locations of archaeological sites that were identified in the surrounding area in 2015 were shared, as shown in the following figure.



**Table 15-2 Archaeological Finds**

DESCRIPTION	PROXIMITY TO PROJECT	PHOTO
Memorial and Burial Site	4 km east of the boundary allotted for WTG	
Burial Site	650 m north of proposed OHTL	
Burial Site	750 m north of proposed OHTL	

During consultations, it was confirmed that archaeological surveys within the Project area must be conducted in areas in which soil will be disturbed for the Project (namely WTG locations, access road, substations, OHTL), as these areas were not included within the 2015 surveys.



The survey was conducted between 16<sup>th</sup> and 31<sup>st</sup> May 2022. Although some ceramic pottery dating from 12<sup>th</sup> – 14<sup>th</sup> Centuries A.D., was identified in the wider area, no sites with signs of cultural or archaeological importance were identified.

The conclusion from the survey was that no buffer zones or micro-siting of WTG/OHTL towers is required, however, construction work (specifically excavations) must take place under the supervision of an archaeologist. Refer to Volume 4 for the full survey report and the conclusion.

## 15.3 Area of Influence and Receptors

### 15.3.1 Area of Influence

The area of influence for archaeological impacts is focused on the physical footprints of each WTG, OHTL tower, access road and any temporary construction areas or facilities required to support construction activities. Impacts on cultural heritage are considered on a wider scale in terms of cultural practices that may be tangible or intangible and defined to a particular culture, specific location, area or region.

### 15.3.2 Receptors

The following table outlines the receptors for archaeology and cultural heritage receptors. Impacts on cultural heritage sites are not anticipated due to the distance between construction activities and sites.

**Table 15-3 Archaeology and Cultural Heritage Sensitive Receptors**

RECEPTOR	SENSITIVITY	JUSTIFICATION
Unknown buried artefacts	Medium	Unknown buried artefacts can be disturbed and damaged during construction works, specifically works involving excavation. From review of baseline information, it is reasonable to assume that any archaeological discoveries could be of national importance, but it is considered unlikely that discoveries would be of international importance.

## 15.4 Potential Impacts, Mitigation, Management & Residual Impacts

### 15.4.1 Construction Phase

#### 15.4.1.1 Direct Impacts to Unknown Buried Archaeology

Archaeological sites have been discovered in the surrounding areas; the identified sites all comprise burial sites. In addition, pottery fragments have been recorded..

The construction phase will require groundworks and excavations in order to install the WTG. These works will disturb the ground and therefore have the potential to affect any unknown historical sites, graves or archaeological artefacts that may reside below the surface, potentially leading to damage or degradation of said artefacts. Any excavation works will be limited to the footprint of the WTG, the access road and internal road, and OHTL tower footprint and therefore are likely to occur mainly during the initial stages of construction.

The implementation of Chance Find Procedure (CFP), wherein construction workers are educated in the correct course of action to take in the event of a 'chance find', greatly reduces the likelihood of any damage being caused.

The CFP should be developed prior to works commencing. The CFP is a Project-specific procedure that outlines what will happen if previously unknown cultural heritage resources are encountered during the land clearance or earthworks, for example by construction staff or drivers. The procedure includes record-keeping and expert verification procedures, chain of custody instructions for movable finds, and clear criteria for potential temporary work stoppages.

Any artefacts if present could be of high value and of national significance. The severity of potential impacts from accidental damage to archaeological artefacts is considered high and impacts have the potential to be irreversible. However, considering the fact that a survey will be undertaken at areas of construction, and with the implementation of GIIP mitigations, the magnitude of potential impacts is unlikely to be significant.

**Table 15-4 Cultural Heritage and Archaeology Impact Significance, Mitigation Measures and Residual Impacts**

POTENTIAL IMPACT	MAGNITUDE	RECEPTOR	SENSITIVITY	POTENTIAL IMPACT SIGNIFICANCE	MITIGATION AND MANAGEMENT MEASURES	RESIDUAL IMPACT
<b>Construction</b>						
Direct Impacts to Unknown Buried Archaeology	<b>Negligible Negative</b>	Unknown buried artefacts	<b>Medium</b>	<b>Minor</b>	<ul style="list-style-type: none"> <li>An archaeological 'Chance Find Procedure' will be developed prior to construction and the start of site earthworks, as part of / or alongside the CESMP. This will include protocols and procedures to stop work and methods to preserve potential finds, as well as reporting requirements and co-ordination with the Institute of Archaeology.</li> <li>Construction work (specifically excavations) must take place under the supervision of an archaeologist.</li> <li>Where artefacts or archaeological remains are encountered, the site will be clearly signed/delineated with high visibility flagging to impede access and prevent any damage or loss of the artefacts which have been found.</li> <li>All direction concerning the management of potential archaeological finds must only be taken from the Institute of Archaeology.</li> <li>The EPC Contractor will receive training about the Chance Finds Procedure and key processes to follow concerning any suspected archaeological finds to avoid disturbance.</li> <li>The removal of any archaeological artefacts from the site is strictly prohibited.</li> </ul>	<b>Negligible</b>

## 15.5 Monitoring

The following monitoring requirements are proposed for Archaeology and Cultural Heritage.

**Table 15-5 Archaeological & Cultural Heritage - Monitoring Requirements**

MONITORING	PARAMETER	FREQUENCY & DURATIONS	MONITORING LOCATION
<b>Construction</b>			
Archaeological Resources & Artefacts	Any archaeological remains within the Project site (based on requirements of the Project's approved Chance Find procedure	Daily continued visual observations by site staff involved in excavations.	All Project locations requiring excavations, earthworks or grading.

## 16 SOCIOECONOMICS

### 16.1 Applicable Requirements & Standards

#### 16.1.1 National Regulations

The following laws are applicable concerning land rights, acquisition and resettlement:

- Civil Code of the Republic of Uzbekistan "Civil code"
- Land Code (1998 as amended 2010)
- Law of the Republic of Uzbekistan on State Land Cadastre No.666-I of 28.08.1998
- Presidential Decree "On Measures for The Efficient Use of Land and Water Resources in Agriculture"
- Resolution № 146 of the Cabinet of Ministers "On the Procedure for Compensation for Losses of Landowners, Users, Tenants and Owners, As Well As Losses of Agricultural and Forestry Production".

#### 16.1.2 Lender Requirements

##### **EBRD**

Performance Requirement 1 outlines the need for assessing social impacts as part of ESIA. This is interpreted to include socio-economic effects to individuals/groups/populations that may be impacted by a project.

Performance Requirement 5 on Land Acquisition, Restrictions on Land Use and Involuntary Resettlement refers to Involuntary resettlement as both physical displacement (relocation or loss of shelter) and economic displacement (loss of assets or resources, and/or loss of access to assets or resources that leads to loss of income sources or means of livelihood) as a result of project-related land acquisition and/or restrictions on land use.

Where resettlement is government led, PR5 requires, *'the client (to) collaborate with the responsible government agency, to the extent permitted by the agency, to achieve outcomes that are consistent with the objectives of this PR.'*

Performance Requirement 7 recognises that *'indigenous peoples are social groups with identities and livelihoods that are distinct from dominant groups in national societies. They may be among the most marginalised and vulnerable segments of the population.'* The PR requires the Project to determine the applicability of this PR as early on in the process as possible.

## EPFIs

Several of the IFC Performance Standards have elements that relate to socioeconomics. Key requirements for the assessment of socio-economic impacts are outlined in PS1, whilst PS5 on Land Acquisition and Involuntary Resettlement has important requirements relating to projects that acquire land or will necessitate physical or economic displacement to Project Affected Persons (PAPs), including compensatory measures.

## 16.2 Baseline

### 16.2.1 Political and Administrative Structure

The Republic of Karakalpakstan is a sovereign democratic republic, being a structural part of the Republic of Uzbekistan. Karakalpakstan's administrative centre is Nukus City, with the republic itself consisting of 15 districts. The Project is located in the Karauzyak district.

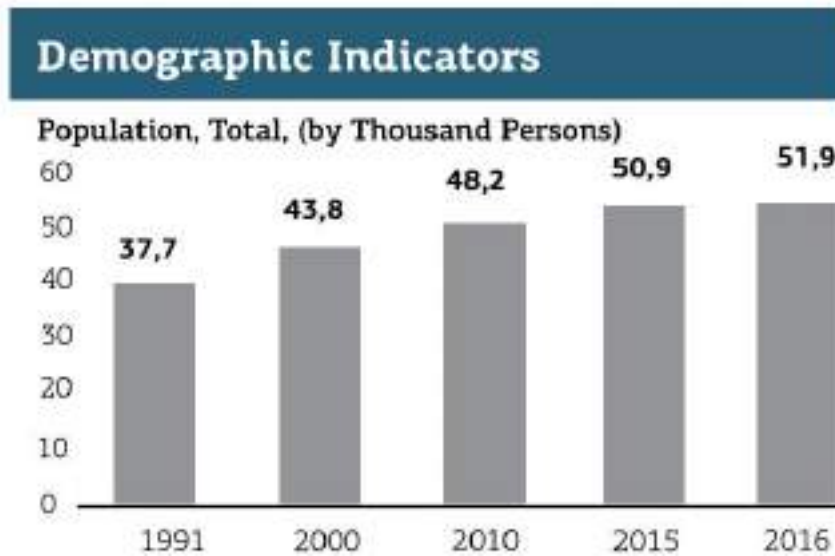
The constitution and the laws of Karakalpakstan were drafted in line with the constitution and the laws of Uzbekistan. The republic has its own flag, emblem and anthem. The Jokargy Kenes (Parliament) of Karakalpakstan, represented by the Chairman of Jokargy Kenes, offers overall guidance for the republic. The highest executive body of Karakalpakstan is the Council of Ministers approved by the Jokargy Kenes. The chairman of the Council of Ministers of Karakalpakstan is also a member of the Cabinet of Ministers of Uzbekistan.

### 16.2.2 Population and Demographics

According to the State Committee of the Republic of Uzbekistan on Statistics, at the beginning of 2022 the permanent population of Karakalpakstan was 1,948,500. The rural population was 994,300 and the urban population was 954,200. Nukus is the largest city with a population of 329,100.

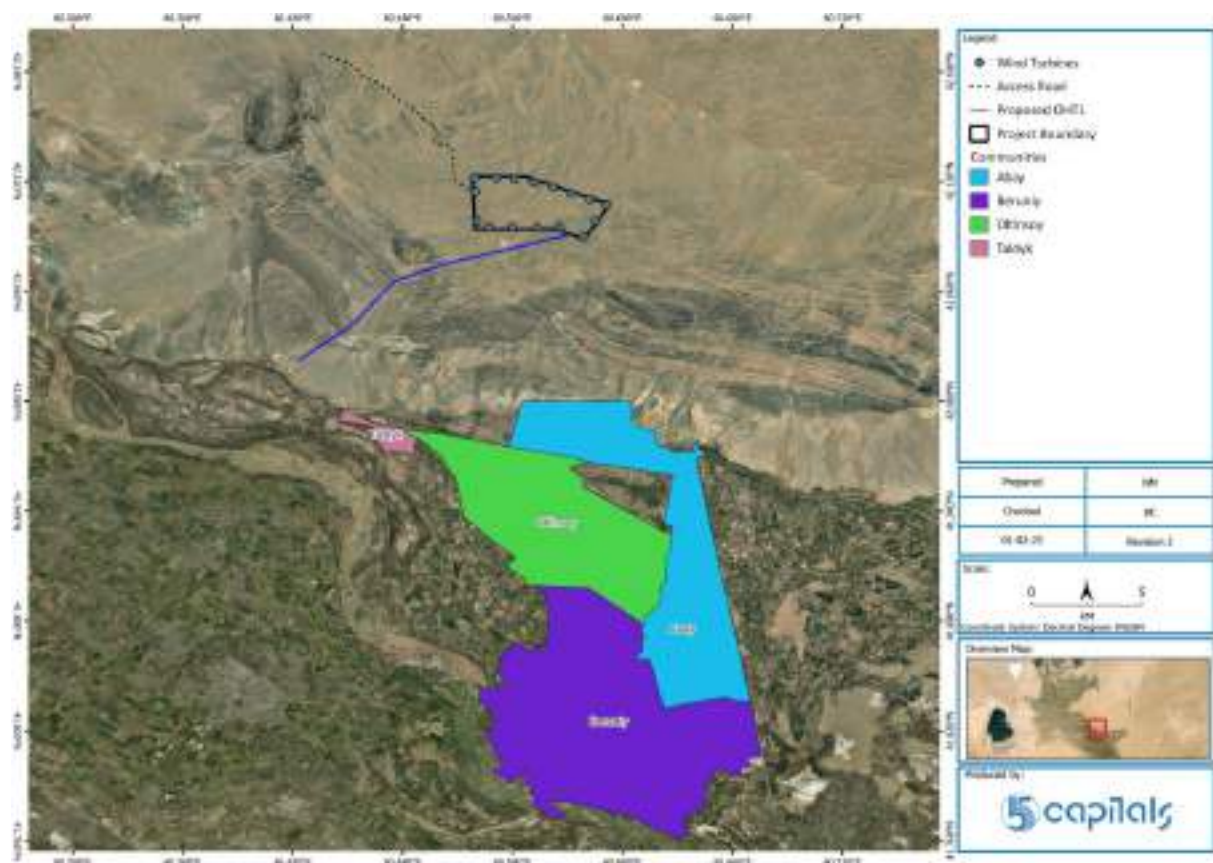
Available Population data for districts within Karakalpakstan is not as recent. In 2018, the Karauzyak district had a population of 52,000, with the rural population 70.2% (36,500) and the urban population 29.8% (15,500). The population by year is shown in the following figure.





**Figure 16-1 Karauzak Population by Year (UNDP, 2018)**

As stated in Section 2.4.2, the closest communities to the Project are Abay, Beruniy, Altinsay (Oltinsoy) and Taldyk, their proximity to the Project is shown in the following figure.



**Figure 16-2 Local Communities**

Further information of local populations and demographics of the local communities to the Project site is provided in Section 16.2.7 – Community Baseline Surveys.

### 16.2.3 Economy and Employment

Karakalpakstan Gross Domestic Product (GDP) share accounted for 3.3% of Uzbekistan's GDP. Karakalpakstan Gross Regional Product (GRP) for 2017 was 8,285.2 billion UZS in current prices, 5.7% higher than 2016 indicators. By the end of 2017, the GRP per capita was 4,527.7 thousand UZS, representing a 4.2% growth. The increase is due to the growth in the main sectors of the region's economy, namely:

- Agriculture, forestry and fisheries;
- Industry;
- Construction; and
- Services.

According to Juru Energy (2021) the main branches of industry in the area of influence include light industry, electricity generating industry, food industry, fuel industry, chemical and oil-chemical industry, flour milling industry and industry of construction materials. Information collected during the ESA site visit for the village of Bestam (a typical village along the Amu Darya River) indicates that the main agricultural activities are livestock rearing and agricultural farming. The main crops are tomato, carrot, onions, green pepper, pumpkin, and commercial trees, including apple, grapes, and pomegranate. Local markets are the primary way of selling crops in the area.

During the December 2021 site visit a number of vermiculite mines were identified to the west of the Project. In addition to this, two cement factories and a facility for oil storage are located south / southwest of the Project on the A380.



**Figure 16-3 Oil Storage Facility**

The Third National Communication of the Republic of Uzbekistan under the UN Framework Convention on Climate Change (2016) states that the total potential of wind energy in

Uzbekistan is estimated in the volume of 2.22 million t.o.e./year and that the highest values of total and technical potential are found within Karakalpakstan.

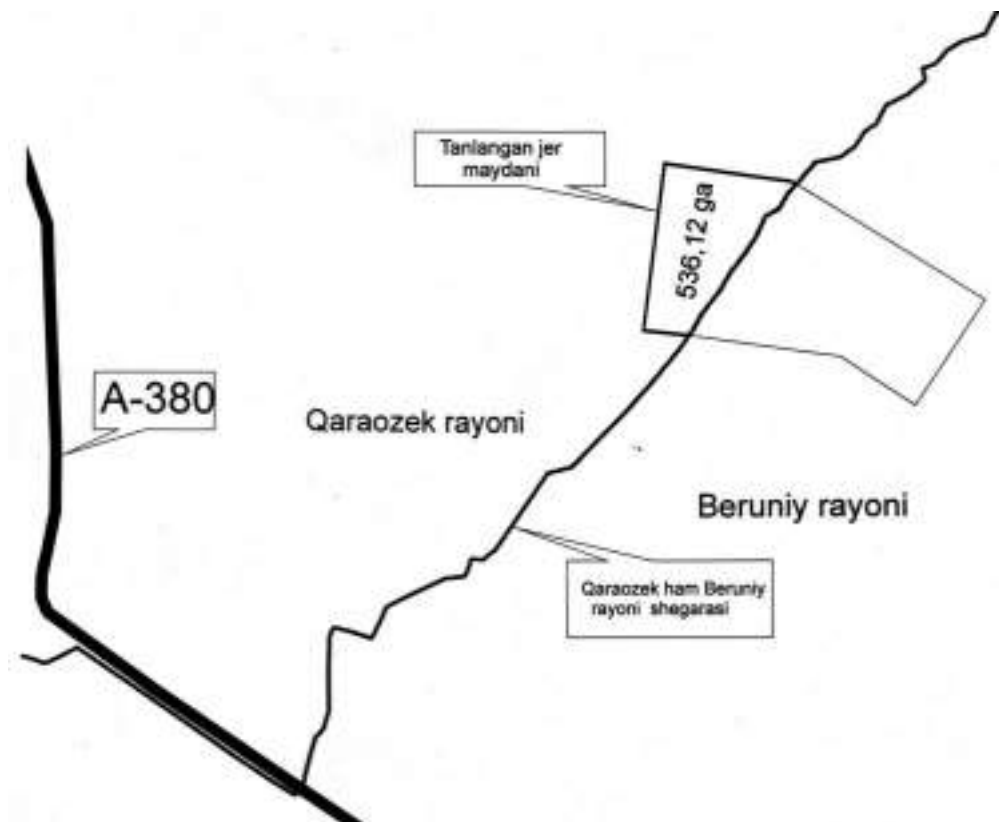
As stated in Section 2.4, the region has been highlighted as an area with high wind energy potential and there will likely be future wind projects developed. In addition to this, areas surrounding the Project have been highlighted as mining concession areas.

#### 16.2.4 Land Use

In Uzbekistan land is owned by the State and therefore no land acquisition is planned.

A consultation letter was issued to the Cabinet of Ministers of the Republic of Karakalpakstan with a request for information on land use and land leases. During follow-up communication, the Cabinet advised the Project team to contact the Cadastral Agency of the Republic of Karakalpakstan in order to speed up the process of obtaining the requested data.

Subsequently, the Cadastral Agency were contacted by phone call and the Agency requested an official letter requesting the necessary information, which was then issued. A response was received stating that the land is on the border of the Karauzak and Beruniy Municipalities, as shown in the following figure.



**Figure 16-4 Land Ownership Diagram**

Further information about the land was also provided, which states that the land is allotted to build a wind power plant within the category 'Other lands not used for agriculture'.

The land use in the area around the Project site includes a herder who uses the land for livestock grazing.

During the December 2021 site visit, three herder shelters were identified (S-1, S-2, S-3). Following communications with the herder, it was determined that one herder family owns all three of these structures and only occupies one at a time.

The herder also stated that shelter S-2 was built to guard the meteorological mast that is located adjacent and that this shelter is not used for overnight stays or residential purposes. The herder was met at the 'winter settlement (S-3)' which is located 5.5 km from the nearest turbine. A summer settlement (S-1) is located 5.8 km from the nearest turbine, at the time of visiting this settlement was abandoned.

The following figures depict herding activity at site and the discussion with the herder at the winter settlement during December 2021.



**Figure 16-5 Herding Activity at Site in December 2021**

The following figure depicts the location of the shelters (S-1, S-2, S-3) relative to the Project.



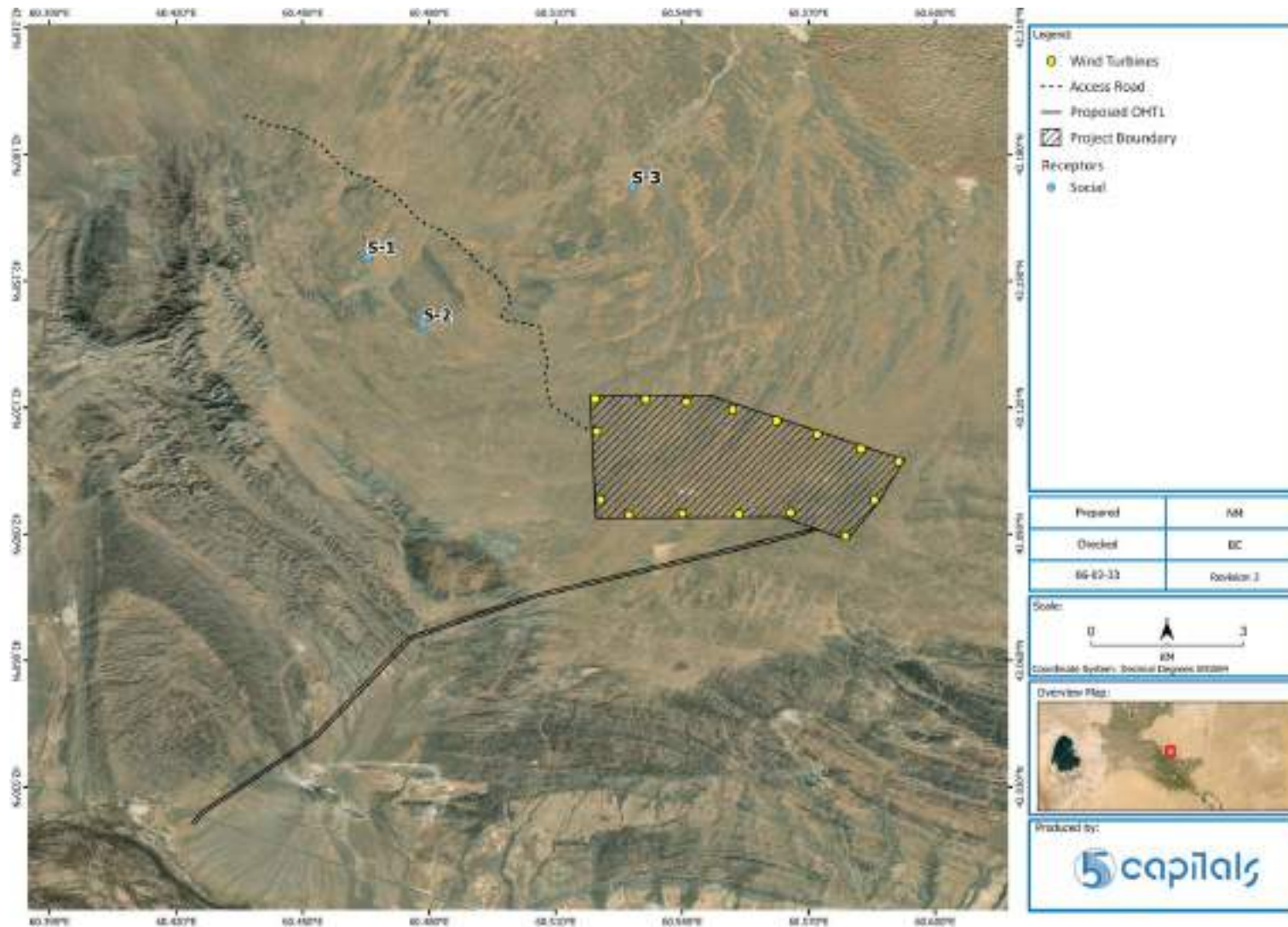


Figure 16-6 Location of Shelters Identified in December 2021



Following identification of the herder and introduction of the Project, a socio-economic survey was conducted via phone. The survey was conducted via phone due to the availability of the herder. The following section summarises the key findings from the survey.

The herder is a 55-year-old Kazakh national with Karakalpakstan citizenship. He owns the identified shelters north-west of the Project site and grazes livestock in the desert surrounding the Project site. He has been grazing his own livestock on this territory since 2016 and he owns 10 horses, 10 camels and 200 sheep.

His permanent residency is in the Beruniy district (50 km south of the Project) where he lives with his family, but the majority of his time is spent at the settlements outside of the Project site. His house in Beruniy is a private house on a lifetime rental basis.

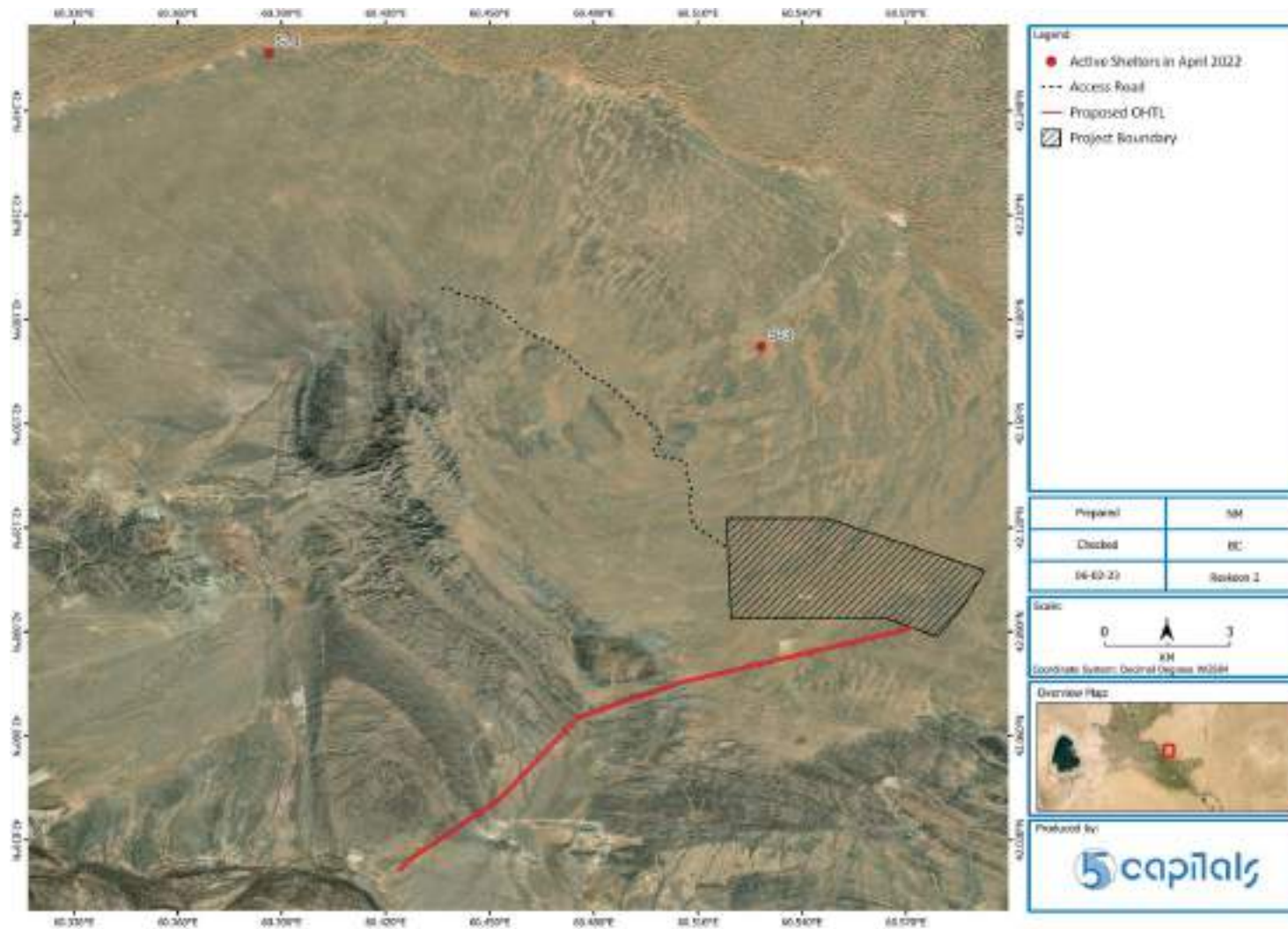
The household consists of seven people, including his wife who was met by the Project team during the December 2021 visit. The herder is the head of his household and is married. He has a secondary special education and does not suffer from any chronic diseases, does not have any disabilities, and does not receive any financial or social assistance. His only source of income is livestock grazing activities and he earned approximately 30,000,000 UZS (2,632 USD) in 2021.

The herder stated that his income is enough to provide his household with food, clothes, and other daily needs. Furthermore, he indicated that the recent COVID-19 quarantine restrictions negatively affected financial condition of the household, as local markets significantly rose in price. In April 2022, further members of the family were consulted with at S-3, as shown in the following figure.

Further discussions with the herder and other family members were conducted on the 14<sup>th</sup> April 2022. General questions regarding construction timeline and whether the Project would be completely fenced were raised. The herder stated that he had no concerns with the Project.

The meeting with the herder on the 14<sup>th</sup> April was conducted at a shelter he owns which is 9 km from the access road and 19 km from the nearest WTG.

Following consultations, it is understood that shelters S-3 and the 'April 2022 Shelter' are the shelters that the herder is currently using. During the April 2022 site visit, the shelter S-2 was derelict / abandoned, and S-1 had no further signs of activity. The locations of the shelters are shown in the following figure.



**Figure 16-7 Location of Active Shelters in April 2022**

Project team members arranged a meeting with the herder on the 20<sup>th</sup> April, the Project information brochure was provided and details including allocated area for the Project, potential impacts, construction procedures and the GRM process were explained. He asked about the stages of construction and specifically about the start of construction. The Project team informed him of the proposed start date and informed him that he will be kept informed with regards to the timeline.

Consultation was conducted with the Deputy Chair of the SWID Committee of the Autonomous Republic of Karakalpakstan on the 30<sup>th</sup> May 2022. He confirmed that the territory around the Project site belongs to the SWID Committee, and that the herder is permitted to graze his animals anywhere in the desert region surrounding the Project site, due to the impossibility of demarcating / delineating his official grazing lands.

During consultations with the herder, he stated that he does not know the exact co-ordinates of the land leased from SWID, and that it is difficult to approximate, due to the large expanse of open desert, however, he typically uses land outside of the Project site but occasionally livestock can walk towards/through the site. It is not clearly defined when, or how often, the Project site land is used. The herder stated that the desert is a large area and there are no other herders present (besides his family). During phone call consultations, the herder estimated that the grazing area he utilises is approximately 46,000 ha.

#### 16.2.5 Public Services & Utilities

Juru Energy (2021) state that public services are limited in the Project area.

Preliminary discussions during the ESA site visit indicate that in Karatau, there is one public school, a hospital and a kindergarten. Women are involved in housekeeping, agriculture, livestock activities, with men generally employed in the aggregate mining sector. During the field visit, local mahallia leaders indicated that the population has mid-level educational qualifications. The next nearest health facilities, local business and emergency response facilities are located in Nukus more than 80 km from the Project site.

The village of Bestam (representative of villages in the area) has approximately 50 persons with one primary school (where children study up to grade 4). The nearest secondary school is about 7 km away in a neighbouring village. Local medical facilities consist of one family and a rural clinic. Drinking water is typically supplied by hand pumps as the village is not connected to the mains supply system.

In Beruniy district, where the identified herder lives, there is a kindergarten and school, but no secondary specialised education institutions or higher education institution. However, there

are available other training/educational centres in the district. There is a public hospital/medical centre in the, however, no private hospital. There are banks in the Beruniy district centre.

There is no existing accommodation near the site suitable for housing construction workers, however, some hotels of adequate quality are found in Nukus city.

### 16.2.6 Indigenous Peoples

The predominant ethnic group in the project area is understood to be the Karakalpaks, and the herder family spoken to during the December site visit is Karakalpak. National laws, specifically the Constitution of the Republic of Uzbekistan, does not officially recognise any IPs. Considering the applicability of PR7 to European ethnic groups, EBRD guidance states that *"in practice, the PR [PR7] is deemed relevant only in Russia as it has been assessed that no group in other EBRD countries of operations (COO) is known to meet the five criteria set out in paragraph 10 of PR7"*.

Uzbekistan is defined as a COO by EBRD; however, as a former soviet republic, Juru Energy (2021) have conducted a screening to understand better whether the Karakalpak exhibits traits that trigger any of the five EBRD criteria. The findings indicate that the Karakalpaks may be considered a distinct group with a distinct language but do not meet the other screening criteria such as collective attachment to geographically distinct habitats or customary cultural practices that are separate from those of the dominant society or culture. Therefore, PR7 has not been triggered, however, ensuring the Karakalpak language is used in project communication will be vital to maximising local employment opportunities and providing an effective communication strategy.

### 16.2.7 Community Baseline Surveys

Focus group discussions were conducted with the Altinsay and Abay communities, both of which are located within Beruniy Municipality, on the 20<sup>th</sup> April 2022. Discussions were conducted separately between men and women.

#### 16.2.7.1 Abay Community

The population of Abay is amounted 4650 people (2315 male, 2335 female) as of January 2022. There were registered 1004 households and 1065 families registered in the community. Community members are of Uzbek, Karakalpak, Kazakh and Turkmen ethnicity, although Tatar (three females), Kyrgyz (one female) are also present. The following tables list details and

characteristics of the population and was obtained from the community administration passport.

**Table 16-1 Population Breakdown for Abay Community**

ABAY COMMUNITY	
Number of low-income families	469
Number of financial support recipients	387
Recipients of financial support for children	387
Number of financial support recipients because of losing family members	7
Vulnerable women*	75
Vulnerable youth**	20

\* in Uzbekistan women are included into the 'Women's Book' if they are considered vulnerable under six categories.

The description of each category is shown below, as referenced from Chapter 2, paragraph 4 of the Decree of Cabinet of Ministries No. 145 dated on March 31<sup>st</sup> 2022 "On measures for further improvement of the system of investigation and solving women's problems::

- Category 1 – unemployed women in need of social protection - low-income women whose employment is not guaranteed, who want to work and do not have a source of income;
- Category 2 – low-income women who want to do business - low-income women who do not have a job and want to do business;
- Category 3 – low-income women who do not have a 'breadwinner' - low-income women whose breadwinner has died, who are held in penitentiary institutions, who suffer from mental illness, who have group I-II disabilities and do not have a permanent source of income, who are missing (by court decision), as well as low-income women and girls whose marriages have been dissolved, and low-income single mothers;
- Category 4 – disabled women of groups I and II in need of social assistance, as well as in need of emergency medical care - women incapable of working, raising others, and also in need of emergency medical care;
- Category 5 – women and girls in need of housing - those who live in unusual places, do not have a place for permanent residence, three or more families live in one house (small yard) (the area of the house is less than the area established by the social norm), and their own or low-income women who do not have a place of residence, in the name of cohabiting family members living in private housing stock on the right to hire;

- Category 6 – low-income women and girls who take care of a disabled child - low-income women and girls directly raising their child - a minor with a disability (regardless of the age of a child with a disability of group I).

\*\* According to the Decree of the Cabinet of Ministers of the Republic of Uzbekistan No. 312 of 06/07/2022, "vulnerable youth" refers to unemployed youth aged 14 to 30 who need social, economic, legal or psychological support.

In Abay there are ten males above 81 (none above 91) and nine females above 81 (one above 91).

With regards to disabilities, the community passport categories disability into the following three categories:

- Group I disability – people who have completely lost the ability to work and need help and care of others;
- Group II disability – people who have completely lost the ability to work but do not need help and care of others; and
- Group III disability – people who have partially lost the ability to work.

In Abay, there are six who fall within the Group 1, 35 in Group II and ten in Group 3.

Participants indicated that the local school and its access roads have been reconstructed in accordance with the program of "Obod qishloq". They stated that, in general, there are no issues associated with schools or kindergarten. Both the school and kindergarten are located 4 km away from the community.

45% of households are connected to the centralised gas system, while the remaining 55% use gas cylinders as a source of cooking. A cylinder costs 24.000 UZS (approximately 2 USD). During winter, coal and wood are normally used as a source of heating and 4 million UZS (360 USD) is typically spent per season.

As Abay has no access to potable water, residents buy potable water in a water container which costs around 150 thousand UZS (2.1 USD) per ton.

According to the participants, there are some specialists at the local hospital. However, the local hospital does not provide all the necessary services. Therefore, in some cases, residents visit a prenatal hospital located 25 km away from Abay community.

The local market is located 30 km away from the community. People spend 3000 UZS (0.24 USD) on buses or 5000 UZS (0.45 USD) on taxi to reach the local market.



Agriculture and livestock activities are the main sources of income in Abay and they use the products grown in their gardens as well as livestock mainly for household consumption. Participants expressed dissatisfaction from the soil since salinity level is significant.

According to the women interviewed, households are normally owned by men and the social status of women is slightly lower. Nevertheless, the women state that there is progress to enhance the female role in the community since women are now being encouraged to study at universities.

With regards to female employment, participants indicated that in Abay a new textile factory has opened and hired women. Although salaries are remarked as average, women indicated that their income is enough only for basic needs. In addition, participants also expressed their interest to work in the project-related work.

### 16.2.7.2 Altinsay Community

The population of Altinsay is amounted 6344 (3287 male, 3052 female) as of January 2022. There were 1191 households and 1237 families registered in the community. Community members are predominantly of Uzbek, Karakalpak and Kazakh ethnicity, although Turkmen (one male, two females), Tatar, Kyrgyz and Russian (one female each) are also present. The following table lists details of the population and was obtained from the community administration passport.

**Table 16-2 Population Breakdown for Altinsay Community**

ALTINSAY COMMUNITY	
Number of low-income families	15
Number of financial support recipients	10
Recipients of financial support for children	182
Number of financial support recipients because of losing family members	1
Vulnerable women	90
Vulnerable youth	50

In Altinsay there are four males above 81 (none above 91) and five females above 81 (one above 91).

With regards to disabilities, there are 11 in Group 1 and 60 in Group II.

Focus group participants indicated that electricity is supplied for all households, however, the voltage of electricity is low.

Access to clean water was remarked as the most difficult problem the community faces, only 12% of the population in Altinsay is provided with clean water. In general, residents of Altinsay will take water from the underground well and occasionally purchase clean water which costs 19000 UZS (1.71 USD) per ton. The quality of the well water is not good and therefore the local community sometimes become unwell.

Altinsay is not connected to gas pipeline due to the significant distance to the gas station. Therefore, the local community experiencing significant difficulties heating their households and cooking. Meanwhile, local people in the community have expressed their concerns about the prices of coal which is considered to be expensive in winter season. The nearest market is located in Beruniy district which is 45 km away from Altinsay and people will use either a taxi or bus to get there (the cost for bus 4000 UZS (0.36 USD) per person and the taxi is 15000 UZS (1.35 USD) per person).

With regards to medical services, there is a polyclinic in the district however it is poorly equipped. Five schools and three kindergartens are operating in the district, although it is was reported that fees for the kindergartens are relatively expensive

Altinsay does not have a factory and the main activity in the community is farming livestock.

The unemployment rate is higher in Altinsay than other communities (559 person are unemployed) since people of working age will typically leave to work either in Russia or Kazakhstan. Additionally, people often cannot find job opportunities based on their knowledge or qualification.

Participants indicated that there are three main concerns in the community:

- Issues associated with irrigation of gardens
- The lack of clean water
- The lack of affordable kindergartens in the community

In addition, participants stated the need for more job opportunities.

The women participants indicated that the owner of household is male, however, the social status of women in the community is satisfactorily protected by community. In recent years additional workplaces have been created by local administrations and there have been efforts to encourage women to exercise entrepreneurship. Female participants requested more job opportunities which can aid in increasing women's income.

Female participants stated that there is a lack of dentist and gynaecology specialists in the community and the nearest prenatal hospital is located 43 km far away which can present a risk to pregnant women.

## 16.3 Receptors

**Table 16-3 Potential Socio-Economic Receptors**

RECEPTOR	SENSITIVITY	JUSTIFICATION
Welfare of local population	High	Any change to access to services, infrastructure, population or regional inputs is likely to have effects on the welfare of the local population in the villages close to the Project site.
Local/Regional Economy	High	The proposed Project is likely to influence regional businesses. Not only local contractors and those directly involved in the construction but also local commercial operations such as food suppliers.
Employment Market	Medium	The development of the Project will result in the creation of employment opportunities and will offer an opportunity for greater dissemination of skills especially during the construction phase of the Project.
Herder using the site & living near to the Project	Medium	The herder family living near Project site are permitted by SWID to graze livestock throughout the surrounding desert region. During consultations, the herder estimated his total grazing area to be approximately 46,000 ha. There is the potential for limited access restrictions during construction.
Vulnerable groups & Women	High	Vulnerable groups & vulnerable women (as defined in Section 16.2.7) can experience disproportionate impacts from the Project compared to other groups.
Workers working within the supply chain	High	Workers working within the supply chain are highly likely to be exposed to risks relating to labour & working conditions.
Water resources	Medium	Given the scarcity of water in the region, the Project demand for water may potentially create a shortage for surrounding local communities or lead to an increase in the price of water in the absence of proper management particularly if water is sourced from the same water supply network used by the local communities

## 16.4 Potential Impacts, Mitigation, Management & Residual Impacts

### 16.4.1 Construction Phase

#### 16.4.1.1 Employment and Economics

The primary economic impact during construction is likely to result from limited project timeline centric employment creation during this phase. This Project is expected to create employment opportunities during the construction phase for unskilled and applicably skilled workers. Where possible, local workers will be hired in order to reduce risk of socio-cultural conflict due to influx of people to the Project area based on their skill set and Project requirements.

As well as the direct monetary uplift to the families of those employed, money paid to workers will also stimulate the local economy via the multiplier effect, whereby money earned on the Project expended locally will re-circulate within the local economy.

Some of the workforce will come from other countries and this could result in the repatriation of wages and a reduction in the benefit to the local economy of wage expenditure.

#### **16.4.1.2 Training and Dissemination of Skills**

In addition to the direct monetary impact of employment created during construction, there also exists the potential for the Project to promote the dissemination of construction and construction support skills, in addition to international occupational health & safety and environmental & social standards, from expatriate workers into the local labour force. This will open job opportunities to the unemployed and increase their probability of securing similar jobs after completion of the Project construction phase.

#### **16.4.1.3 Purchase of Construction Materials and Food Products Locally**

Additional secondary impact on the local economy is likely to arise from spending on local and foreign goods and services during the construction process. The nature of the development, and specialised nature of required materials, suggests that these will be sourced internationally, apart from construction materials (e.g., concrete, aggregate, etc.) which will be sourced locally.

There is also the potential for purchase of food products locally to boost the local economy where local people are able to sell vegetables and daily products to the workers. However, workers buying goods from the small community shops could potentially lead to an increase in retail price of basic commodities which would impact the local households negatively

#### **16.4.1.4 Consumption of Water**

The key uses of water during the construction phase are expected to be for personal consumption, domestic use, dust control and civil works. At this stage it is understood that water will be supplied to the Project site via water tanker trucks, however, it has not been confirmed where the water will be sourced from.

Based on the socio-economic survey undertaken, water is typically bought from water suppliers. As such, If the supply of water to the Project site is not properly coordinated and managed, the Project demand for water may potentially create a shortage for the local community, or an increase in the price of water.

#### **16.4.1.5 Disproportionate Impacts to Vulnerable Groups and Women**

Vulnerable groups and women are likely to be impacted differently compared to other groups in the local communities. This means that they may not be able to enjoy all the benefits of the Project. For instance, women and people living with disabilities in the local communities may experience challenges and unequal opportunities during the recruitment process due to existing biases. They may also be exposed to gender-based violence and harassment due to the presence of new workers in their communities including other labour violations (Further discussed in the Community Health, Safety and Security, and the Labour & Working Conditions Chapters).

#### **16.4.1.6 Land Use Change**

During discussions with SWID and the herder, it was determined that the grazing lands are not delineated, nor are they easy to approximate, due to the large expanse of desert area and difficulty in delineating such a large open area. SWID stated that the herder is permitted to graze his animals anywhere in the desert region surrounding the Project site. The herder, and his family, herd 200 sheep, 10 horses and 10 camels throughout his total grazing area which, he has (during phone call consultations) estimated to be >46,000 ha. The shelters currently used by the herder are approximately 6 km and 19 km from the nearest WTG respectively. During consultations, he stated that he typically uses land outside of the Project site but occasionally livestock can walk towards/through the site. It is not clearly defined when, or how often, the Project site land is used. During consultations, the herder stated that he had no concerns with the Project.

There is the potential for temporary disruption in livestock grazing activities, however, this would be limited to the active construction areas. It is understood that not all WTG would be constructed at the same time and only sections of the access road would be constructed at one time, therefore, it is unlikely that large portions of the site would be restricted. Once construction has been completed then only the land immediately adjacent to the WTG would be fenced for safety reasons and therefore livestock will be free to graze throughout the site.

On this basis, the Project is not expected to negatively impact the livelihood of the herder or his family. However, the herder's family will remain a stakeholder in the SEP for the implementation of the Project and will have access to the GRM should any issues need to be raised. Issues will be dealt with on a case-by-case basis.

The above is relevant for both the access road and land allocated for the WTGs. No land use impacts are applicable for the OHTL.

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#### **16.4.1.7 Disruption of Local Custom**

The influx of workers and migrants to the Project site could potentially introduce new habits or practices that are not consistent with the local culture. This could lead to potential conflict with the new workers or decline in social cohesion between the local communities. However, due to the relatively small number of required construction workforce (peak workforce is estimated at 150), and the distance from the site to the local communities, this impact is expected to be negligible.

#### **16.4.1.8 Expectations of the Local Communities**

During consultations with the local communities, participants provided suggestion on the social services they would like the Project to provide. Besides the provision of employment opportunities, the community members had the suggestion to improve water availability.

The Project Developer will assess the suggestions in consultations with the local government municipalities to determine suitability, existing government initiatives etc.



**Table 16-4 Socioeconomics Impact Significance, Mitigation & Management Measures and Residual Impacts – Construction**

POTENTIAL IMPACT	MAGNITUDE	RECEPTOR	SENSITIVITY	POTENTIAL IMPACT SIGNIFICANCE	MITIGATION AND MANAGEMENT MEASURES	RESIDUAL IMPACTS
Employment Opportunities	<b>Minor Positive</b>	Employment Market	Medium	<b>Minor Positive</b>	<ul style="list-style-type: none"> <li>Contractor will seek to employ local workers where possible, including women. This will be done in consultation with the local administration and community leaders.</li> <li>The EPC Contractor will give priority to the local people while employing unskilled and semiskilled labor forces from the Project area.</li> <li>The EPC and sub-contractors' HR Policy will be prepared to ensure consistency in line with local labour laws and international ILO and UN conventions. The EPC Contractor is to ensure that this is applied as an overarching policy for all sub-contractor company HR policy as part of their contractual arrangements.</li> <li>EPC Contractor will undertake local community consultation during recruitment process in order to consider equitable job opportunity distribution among the locals to avoid conflict between the local people</li> <li>The EPC Contractor will provide equal employment opportunities to women and preferences will be given to local women for unskilled and semi-skilled labour positions.</li> </ul>	<b>Minor Positive</b>
Training and dissemination of construction skills	<b>Minor Positive</b>	Local Population	High	<b>Minor Positive</b>	<ul style="list-style-type: none"> <li>All Project workers will receive induction training at the Project, as well as vocational specific training for on-site construction works.</li> <li>All workers will receive training in regard to health and safety, as well as environmental and social awareness.</li> <li>Toolbox talks will be conducted before work on each day to ensure workers are reminded of key topics.</li> <li>Cultural awareness training for all foreign workers and those coming from other regions in Uzbekistan.</li> </ul>	<b>Minor Positive</b>
Purchase of construction materials and food resources locally	<b>Minor Positive</b>	Local/Regional Economy	High	<b>Minor Positive</b>	<ul style="list-style-type: none"> <li>The EPC Contractor will purchase goods and materials from the local/regional economy where possible.</li> <li>The EPC Contractor will purchase some of the food products such as meat, milk from the suppliers.</li> <li>Establish market network between the Project workers and the local people where possible in consultation with the community leaders. Monitor prices of basic commodities.</li> <li>The EPC Contractor will ensure that the influx in workers does not lead to an increase in retail prices of basic commodities by providing the</li> </ul>	<b>Minor Positive</b>

POTENTIAL IMPACT	MAGNITUDE	RECEPTOR	SENSITIVITY	POTENTIAL IMPACT SIGNIFICANCE	MITIGATION AND MANAGEMENT MEASURES	RESIDUAL IMPACTS
					workers with food or giving them transportation to larger towns where they can buy food and non-food items.	
Consumption of Water	<b>Moderate Negative</b>	Water Resources	Medium	<b>Moderate</b>	<ul style="list-style-type: none"> <li>The EPC Contractor will engage a licensed water tanker trucks and obtain relevant permits.</li> <li>Prior to engaging a licensed water supply company, the EPC Contractor will determine the source of the water to be used for the Project.</li> <li>Where water is sourced from the same water supplier that nearby villagers use, the EPC Contractor will undertake sustainability assessment to ensure that the Project's water demand does not create a shortage for the local communities or drive up the price of water.</li> <li>The Project workforce will be trained on ways to minimise water consumption and to ensure they have an understanding of water resources and resource efficiency.</li> <li>The grievance mechanism will allow communities to lodge any complaints or concerns regarding water issues related to the Project.</li> <li>Water storage tanks, pipes, taps etc. will be inspected for leakage and repaired immediately once identified.</li> </ul>	<b>Minor</b>
Disproportionate impacts on vulnerable groups	<b>Minor Negative</b>	Vulnerable groups & women	High	<b>Minor</b>	<ul style="list-style-type: none"> <li>The CLO will regularly undertake informal meetings including with women focus groups &amp; vulnerable groups to ensure that on-going stakeholder engagement is gender inclusive.</li> <li>The Project Company will ensure that the EPC Contractor employs a female within the social experts who will support the CLO in addressing potential gender-based violence and harassment issues.</li> <li>Implementation of mitigation and management measures provided under Community Health, Safety &amp; Security and Labour &amp; Working Conditions.</li> </ul>	<b>Negligible</b>
Disruption of Local Custom	<b>Negligible Negative</b>	Welfare of Local Communities	High	<b>Minor</b>	<ul style="list-style-type: none"> <li>The EPC Contractor will provide adequate training to the non-local workers in the Project, especially in terms of interaction with the local community members.</li> <li>Local residents will be able to report concerns associated with loss of cultural values through the grievance mechanism.</li> <li>The EPC Contractor will adopt a zero-tolerance policy towards unacceptable workforce behaviors towards females or any community members i.e., sexual harassment or violence.</li> <li>The grievance mechanism will be made available to the local communities i.e., community members can make verbal or written</li> </ul>	<b>Minor</b>

POTENTIAL IMPACT	MAGNITUDE	RECEPTOR	SENSITIVITY	POTENTIAL IMPACT SIGNIFICANCE	MITIGATION AND MANAGEMENT MEASURES	RESIDUAL IMPACTS
					complaints at the Project security gate or request to speak to the Environmental Manager	
Land Use Change	<b>Negligible Negative</b>	Herder family living near to the Project	Medium	<b>Negligible</b>	<ul style="list-style-type: none"> <li>The herder will continue to be consulted with throughout the ESIA stage, and implementation of the Project.</li> <li>The GRM process and contact details have been provided to the herder and family in accordance with the SEP.</li> <li>The EPC Contractor will clearly mark out construction areas which will be inaccessible during the construction phase of the Project.</li> <li>If required, alternative access roads for the local communities will be identified before access to any of the existing roads is restricted. The alternative roads must be in good condition to allow for vehicle, livestock passage and safe for walking.</li> <li>The Community Liaison Officer will notify the communities of any access restrictions.</li> <li>Signs will be put in place in local languages to show the alternative access routes available to the herders and local communities once the construction areas have been demarcated.</li> <li>Monitoring will be conducted to ensure that the herders' livelihoods are not impacted in the future.</li> </ul>	<b>Negligible</b>

### 16.4.2 Operation Phase

At a strategic level, the operation of the Wind Farm is a proactive measure towards a low carbon transition for Uzbekistan's economy harnessing the wind resources in the country. The Project will reduce Uzbekistan's dependency on fossil fuel generated power and will reduce atmospheric pollution in line with the Uzbekistan 2030 Energy Strategy. It will also support the continued growth of the national economy through the provision of sufficient power supply.

As with the construction phase, an economic impact during operation will result from any local employment created by the Project. The operational phase will however require significantly fewer staff than during construction, with an estimated maximum of 15 permanent staff. Besides management and technical operator positions, the majority of staff will be security teams and other office-based support staff. Such non-technical staff will likely be sourced locally based on ACWA Power's typical processes and observed track record of other projects.

Whilst the size of the required workforce is significantly smaller, the type of work and the increased timescales involved offer an opportunity for greater dissemination of skills. A targeted system of local recruitment and investment in the human capital of the local workforce will enhance this process and consequently increase the benefit to the local economy.

**Table 16-5 Socioeconomics Impact Significance, Mitigation & Management Measures and Residual Impacts – Operation**

POTENTIAL IMPACT	MAGNITUDE	RECEPTOR	SENSITIVITY	POTENTIAL IMPACT SIGNIFICANCE	MITIGATION AND MANAGEMENT MEASURES	RESIDUAL IMPACTS
Sustainable supply of energy	<b>Moderate Positive</b>	NEGU	-	<b>Moderate Positive</b>	<ul style="list-style-type: none"> <li>Ensuring that the appropriate operation and maintenance of the Wind Farm to enable a secure supply of renewable energy</li> </ul>	<b>Moderate Positive</b>
Employment Opportunities	<b>Minor Positive</b>	Employment Market	Medium	<b>Minor Positive</b>	<ul style="list-style-type: none"> <li>The Project's recruitment policy will ensure a preference for employing workers from the local population especially women where appropriately skilled workers are available locally (or if unskilled positions are available).</li> <li>The HR Policy will be prepared to ensure consistency with the ACWA Power's Environmental &amp; Social Management System Implementation Manual which will ensure compliance with local labour laws and international ILO and UN conventions.</li> <li>Workers will be encouraged to develop their careers and may be provided with opportunities to attend training courses and other career development processes.</li> <li>Training plans to be developed and implemented to facilitate career development and advancement within the local workforce.</li> </ul>	<b>Minor Positive</b>
Training and dissemination of skills	<b>Minor Positive</b>	Welfare of Local Population	High	<b>Minor Positive</b>	<ul style="list-style-type: none"> <li>All Project workers will receive induction training at the Project, as well as vocational specific training for on-site works, as required</li> <li>All workers will receive training in regard to health and safety, as well as environmental and social awareness.</li> </ul>	<b>Minor Positive</b>

## 16.5 Monitoring

**Table 16-6 Socioeconomic Monitoring Requirements – Construction and Operation**

MONITORING	PARAMETER	FREQUENCY & DURATIONS
Employment	Number of persons employed from the villages near the Project site	On-going
Third Party Grievances	Issues concerning socioeconomic factors or land use/ownership	Ref. to Grievance Mechanisms section in SEP



# 17 COMMUNITY HEALTH, SAFETY & SECURITY

## 17.1 Applicable Requirements & Standards

### 17.1.1 National Regulations

- Decree of the Cabinet of Ministers of the Republic of Uzbekistan No.1050 "On approval of Rules for Protection of Power Grid Facilities, 2018".
  - This determines the procedure for establishing protected zones for power grid facilities, as well as special conditions for using land located within the protected zones and ensure the functioning and operation of the said facilities.
  - Construction of power grid facilities with 110, 220 or 500kV in protected areas of state nature reserves, protected areas of nature parks and state biosphere reserves etc shall be allowed with the permission of the Cabinet of Ministers of the Republic of Uzbekistan.
  - Protected zones of power grid facilities shall be established on both sides of the power transmission line from the outermost wires and along the perimeter of substations at the following distances for voltages;
    - 110kV: 20 m;
    - 220kV: 25 m; and
    - 500kV: 30 m.
- San Rules & Norms No. 0236-07 "Sanitary norms and rules to ensure safety for people living near high voltage power transmission lines, 2007".
  - This regulation sets the requirements for ensuring public safety when overhead power lines pass over populated, unpopulated or inaccessible territories.
  - It requires sanitary norms and rules to be followed in the design, construction and operation of overhead power lines.
  - The distances corresponding to the projection onto the ground of the outer phase wires in a direction perpendicular to the overhead line as follows:
    - Up to 110kV/m: 10 m;
    - Up to 220kV/m: 15 m;
    - Up to 330kV/m: 20 m;
    - Up to 500kV/m: 30 m; and
    - Up to 570kV/m: 40 m.
- Article 18 of the Air Code for the Republic of Uzbekistan
  - This provides the details on the procedures to obtain permission to carry out activities that may pose a threat to flight safety. Chapter III sets out the necessary documents to obtain from the developer for constructing facilities located near civil aviation aerodromes.
- Aviation Regulation AP RUz -150 No.73 of 31.07.2006

- According to Chapter IV, clause d, AP RUz-150, stationary objects with a height of 50m or more, regardless of their location, must be marked.

Chapter V states that "White lights operating in flashing mode can be used to illuminate freestanding obstacles located outside the airfield zones that do not have extraneous lights around them. The flash strength of the obstruction light must be at least 10 candelas (cd) and the flash rate must be at least 60 per minute."

Other requirements for equipping objects with light-shielding lights will be provided by Civil Aviation Authority (CAA) specialists who shall study the coordinates of the objects (in the WGS-84 system) and their technical characteristics.

- Resolution of Cabinet of Ministers of Republic of Uzbekistan No.95 "On approval of general technical regulations of environmental safety" 2020.

### 17.1.2 Lenders Requirement

#### **EBRD**

Performance Requirement 4 establishes the importance of avoiding or mitigating adverse health and safety impacts and issues associated with project activities on workers, project affected communities and consumers. The objectives of EBRD PR4 are:

- To protect and promote the safety & health of workers by ensuring safe and healthy working conditions and implementing a health and safety management system, appropriate to the relevant issues and risks associated with the Project.
- To anticipate, assess and prevent or minimise adverse impacts on the health and safety of project affected communities and consumers during the project lifecycle from both routine and non-routine circumstances.

#### **EPFIs**

IFC Performance Standard 4 establishes requirements to safeguard local communities from potential risks associated with the Project including impacts associated with introduction of communicable disease, site access and operation, material use etc. The key objectives of PS4 are:

- To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances.
- To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.

*IFC Guidance on Gender Based Violence and Harassment (GBVH)*

According to the guidance, addressing GBVH can build relationships and provide a Project with a social license to operate in communities. This can result from regular dialogue to understand and track project GBVH risks as well as the effective use of measures to prevent and respond to GBVH. In addition, it broadens the pool of potential workers that companies can draw upon, including women workers from nearby communities because of lower perceived risk of GBVH.

*World Bank Good Practice Note on Addressing Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH) in Investment Project Financing Involving Major Civil Works*

The Good Practice Note is structured around three key steps that cover project preparation and implementation. These steps include:

- Identifying and assessing the risks of SEA/SH, including social and capacity assessments.
  - Undertaking social risk assessment of community-level risks.
  - Assess capacity and availability, safe and ethical services of survivors.
  - Review ability of the client to respond to SEA/SH risks.
  - Rate project for overall risk using several Bank tools including the SEA/SH Risk Assessment Tool.
  - Establish procedures to review and update risk assessment during the project implementation.
- Establishment of mitigation, reporting and monitoring measures.
  - Based on risks identified, identify the corresponding mitigation measures and implement actions suggested to mitigate project related risks of GBV in the project area.
  - Monitor effectiveness of the mitigation measures and adapt as appropriate.
- Project response actions for GBV cases.
  - Provide essential services for survivors.
  - Report case through the GM as appropriate keeping survivor information confidential and anonymous.
  - Document and close cases brought through the GM.

*United Nations Guiding Principles on Business and Human Rights*

In addition to adhering to human rights requirements under the Uzbekistan laws and lenders requirements, the project construction and operational phases will be required to adhere to the United Nations Guiding Principles on Business and Human Rights. The Guiding Principles are grounded in recognition of the role of business enterprise as specialised organs of society required to comply with all applicable laws and to respect human rights.

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*Equator Principles Guidance on Implementation of the Equator Principles During the COVID-19 Pandemic*

The guidance recommends that the borrower should:

- Review potential risks on local communities, including direct and indirect impacts of COVID-19 and other impacts relating to worker interfaces and how any Project changes during this period might affect the community.
- Assess its mitigation approach to Project related impacts.
- Identify opportunities to support communities mitigate wider COVID-19 risks/impacts either through new initiatives or building on existing programmes i.e., provision of food for vulnerable people in isolation, test kits, medical facilities and equipment etc.

## **17.2 Baseline Conditions**

### **17.2.1 Nearby Communities**

As stated in Section 2.4.2 and the Socioeconomics Chapter, there are no permanent communities within 10 km of the nearest WTG, Taldyk community is closest to the OHTL and 3.5 km distance. The two shelters used by the herder are 6 km and 19 km from the WTGs. The A380 road passes adjacent to the Abay and Beruniy communities .

### **17.2.2 Health Protection Zone**

In order to fulfil the requirements, set out in SanPiN No 0350-17 of establishing a health protection zone, an initial consultation letter was issued to the Agency for Sanitary and Epidemiology Welfare under the Ministry of Health of the Republic of Uzbekistan requesting the requirement for the Health Protection Zone of the Wind Farm Project as it is a Renewable Project and there are no specific emission sources from the Project.

The Agency responded on 24/03/2022, stating the standards concerning the size of the Health Protection Zone for the OHTL, referring to 'San Rules & Norms No. 0236-07 "Sanitary norms and rules to ensure safety for people living near high voltage power transmission lines, 2007. As a follow up, the Project team requested information on the health protection zones from turbines. The Agency responded on 08/04/2022 establishing the protection zone around each turbine as 1000 m.

### 17.2.3 Existing Public Infrastructure

#### AIRPORTS

The closest airports to the Project site are Urgench International Airport (55 km south of the Project), Dashoguz International Airport (67 km southwest) and Nukus International Airport is (85 km west).

#### TELECOMMUNICATION SYSTEMS

An initial consultation letter was issued to JSC "Uzbektelecom". A response was received on 28/03/2022, in their response, Uzbektelecom stated that the Project OHTL corridor intersects with an underground communication cable. Within their response they gave conditions relating to construction works close to this intersection, these conditions are to be shared with the EPC Contractor.

### 17.2.4 Gender based Violence, Harassment and Exploitation

The population of Uzbekistan follows a patriarchal culture with an inherent bearing on gender equality in education, employment and political representation. Historically, various forms of violence, harassment and exploitation have prevailed across the country.

Since 2017, the country's Parliament and Government have made significant efforts to increase the economic and social inclusion of women, which were part of the transformative reform agenda launched after many years of stagnation and isolation from the outside world. These culminated in the passage of the two historic laws to guarantee women and men equal opportunities and to protect women from violence and oppression, in 2019. The law to protect women from violence establishes a legal basis for police complaints against gender-based violence, giving way to the systematic protection of victims. Although violence against women is illegal under existing criminal laws, no provisions previously existed for the registration of gender-based violence cases, nor for measures that are recommended to support and protect victims. The passage of the new legislation recognises gender-based violence as a distinct type of criminal offense, and sets out special requirements for the registration, processing, and enforcement of these cases. Moreover, under this law, the Government has committed to providing support to affected women and girls, including free legal, economic, social, psychological, medical, and other services. In January 2020, the Uzbek authorities approved measures to establish protection orders for victims of gender-based violence, enabling the respective state agencies to provide police and other support to those in need (Mantovanelli, 2021).

## 17.3 Potential Impacts, Mitigation, Management & Residual Impacts

This chapter assesses the impacts relating to the health & safety of the local community who live and work in the surrounding area and may be subject to Project related impacts.

The majority of secondary impacts relating to the local community in terms of air quality, noise, wastewater, waste etc., have been addressed in specific chapters elsewhere in this ESIA. This chapter therefore concentrates more specifically on the potential emergency impacts that could relate to the Project, and the security of the Project to avoid instances of trespass, malicious intrusions and other misdemeanours.

The primary purpose of this chapter is therefore to identify specific management measures regarding community, health, safety and security.

### 17.3.1 Construction Phase

#### 17.3.1.1 Worker Influx, Community Health and Crime

##### ACCOMMODATION

The construction phase of the Project will require a dedicated workforce of permanent staff, contractors, as well as the use of specialist sub-contractors and key supply chains. This will lead to an increase in the population on-site and surrounding community during construction. The estimated construction workforce is relatively small at 150, and at this stage it is understood that staff accommodation facilities will be located on the Project site, however, it is possible that the sub-contractors may need to arrange for accommodation facilities off-site in the local communities or neighbouring towns and therefore may come in contact with local populations.

It is expected that some of the Project workers will come from outside of the Project area and the Karakalpakstan region and there will also be international experts. The influx of such workers from other regions of Uzbekistan and outside Uzbekistan could potentially lead to cultural or religious conflicts with the local communities. Workers may have alternative ideals, behaviour and cultural practices than the local population. Such interactions could lead to potential conflicts.

##### DISEASE AND ILLNESS

The interaction of workers from different areas (and parts of the world), as well as the close-knit mixing of workers onsite and in accommodation may result in the transfer of certain communicable disease and/or illnesses. This may also impact upon communities where



interactions take place. Such diseases include Sexually Transmitted Illnesses (STIs) and skin infections. There will also be a potential risk of transmitting COVID-19 between the workers and the communities near the project site and off-site accommodation areas.

There is also potential for construction excavation activities on the site to create breeding grounds for bacteria and parasites which will not only affect the workers but the local communities too. Any potential contamination from the site such as spillage of raw sewage or hazardous materials could potentially result into water related and water borne diseases through contamination of surface and groundwater.

#### HIV/AIDs

The influx of construction workers, many of whom may be from other regions in Uzbekistan and some international workers away from their families, poses a health risk to both workers and the local communities. The EPC Contractor will therefore be required to run a sexual health and HIV awareness campaign with the production of information leaflets to be distributed in the local communities in coordination with local health officials and awareness training among the Project workers.

### **17.3.1.2 Safety**

All construction projects have potential risks relating to public safety that could arise, particularly in regard to the use of high-powered equipment, heavy construction machinery, excavations, transportation of oversized loads and use of HGVs. Risks also include fire and pollution releases.

Risks will be suitably managed in the construction phase through the implementation of a robust CESMP and the preparation and implementation of an Emergency Preparedness and Response Plan.

### **17.3.1.3 Security**

The construction phase of the Project will require site-based security to prevent the public from trespassing to the construction areas. This is to minimise the potential for construction site incidents or damage of construction machinery.

There is a risk that the security personnel who are mandated with providing protection to the workers can abuse their position of power and status and become perpetrators of GBVH either to the members of the workforce or the community.

Following suitable security risk assessment by the EPC Contractor, the security arrangements will require to be guided by UN Code of Conducts for law enforcement officials, the IFC's Good

Practice Handbook on the Use of Security Forces: Assessing and Managing Risks and Impacts, the Voluntary Principles on Security and Human Rights and the UN Basic Principles on the use of Force and Firearms by law enforcement officials in case security at the site will be armed.

In addition to this, security personnel will receive internal training in regard to managing grievances (i.e., being trained in who and how to direct the complainant to the appropriate communication channels), The workers, if not from the region, will also receive cultural awareness training with regard to local customs.

#### **17.3.1.4 Human Rights Risks to Local Communities**

Based on the Project's area of influence (as per potential impacts upon different environmental and social parameters), there are expected to be specific Project impacts to the local herder. A Grievance Mechanism will allow any third parties to raise grievances against the Project without cost, retribution or fear of negative consequences.

In addition, the Project will ensure that the right of local communities to a clean and safe environment is safeguarded through the implementation of mitigation and management measures detailed in this ESIA including adherence to the monitoring requirements.

##### **RIGHT TO SECURITY**

The interaction of workers with local communities could lead to an increase in illicit behaviour such as alcoholism, prostitution, gambling, etc. all of which can result into robbery and crime. Increases in crime pose safety risks to the local communities thereby interfering with right to security of the local communities.

In addition, security personnel may also abuse their position of power to violate the rights of community members. To address this, the project will be required to implement the mitigation measures detailed in the Security section.

##### **RIGHT TO HEALTH**

The influx of workers and migrants to the project area will potentially result in additional pressure on local clinics especially in case of an emergency if no alternative health facilities (i.e., site clinic) are provided for the workers.

As such, the EPC Contractor, will be required to have a site-based health clinic and make arrangement with other regional hospitals so that the services to the local communities are not undermined.

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## ECONOMIC RIGHT

During construction, the Project will cause temporary restriction on use of land and access by herders who graze livestock at the Project site, thereby impacting the herder(s)' right to access resources that support their livelihoods.

From a human rights perspective, displacement and temporary restrictions to accessing the site must not result in a detriment to human rights nor should it create obstructions to the right to continuous improvement of living conditions (Van der Ploeg & Vanclay, 2017).

Following determination of loss of grazing lands, the Project may be required to implement a Livelihood Restoration Plan and comply with IFC PS5 and EBRD PR5 in order to ensure that the impacts of the Project are minimised and managed.

### 17.3.1.5 Human Right Risks to Vulnerable Groups

#### RIGHT OF ETHNIC MINORITIES

The Project will ensure that the right to information and participation for any ethnic minorities is maintained through the implementation of the stakeholder engagement and awareness creation of the grievance mechanism. In addition, all Project information will be made easily accessible and in appropriate languages (such as Karakalpak, Khorezm, Uzbek) and the EPC Contractor will hire translators where necessary.

As stated in the Socioeconomic Chapter, Project there are no people who possess the characteristics of indigenous people.

#### GENDER BASED VIOLENCE AND HARASSMENT, SEXUAL EXPLOITATION AND ABUSE AND SEXUAL HARASSMENT

The Project will lead to an influx of workers during the construction phase majority of whom will be young men who will be away from their families. This may increase the demand for sex workers and put women and children from other regions in Uzbekistan at the risk of being trafficked to the Project area for the purposes of sex work.

The influx of workers could pose a risk to young adolescent girls who may be at risk of being forced into early marriages to Project workers who are perceived to have better wages. It could also increase the risk of GBVH/SEA/SH against the children in the community who have no ability to give consent, are not empowered to refuse any sexual advances made towards them or anticipate the implications of any actions against them. Exposure to GBVH/SEA/SH has the potential to have profound, long-term impacts on the health and mental well-being of the victims.

In addition, the presence of young men in the Project area could also lead to shift in the community's power dynamics and within households. This may be manifested through male jealousy if the workers are believed to be interacting with the women in the community, potentially triggering violence towards the women.

The EPC Contractor will be required to conduct a GBVH/SEA/SH risk assessment and conduct training among all Project workers regarding these risks. In addition, a GBVH Policy will be put in place detailing the list of unacceptable behaviour among workers, provisions for reporting, sanctions for perpetrators and available resources and support systems for the victims.

### 17.3.2 Operational Phase

#### 17.3.2.1 Blade and Ice Throw

In the event that a wind turbine fails this can result in a blade becoming detached and falling resulting in safety risk to local communities (including herders). During cold weather conditions such as snow, ice can accumulate on the blades and pieces of this ice can be thrown to surrounding areas while the blade is rotating or dropped on the ground if the turbine is idle.

To date no Health Protection Zone has been established by the Agency for Sanitary and Epidemiology.

According to the WBG/IFC EHS Guideline on Wind Energy a minimum setback requirement of  $1.5 \times$  turbine height (tower + rotor radius) is required for blade throw, therefore for the Project a setback of 309 m is required. A minimum setback requirement of 1.5 (rotor diameter + hub height) is required for ice throw as established in International Energy Agency on Wind Energy Projects in Cold Climates and referenced in the IFC EHS Guideline on Wind Energy. For the Project a 437 m setback is required for ice throw.

As all of the WTGs are over 3.5 km from the nearest shelter, which is understood to no longer be used, and over 5 km from currently used shelters, the likelihood/risk of blade & ice throw is anticipated to be negligible. In addition, it is expected that the wind turbines will be subject to continuous monitoring and regular maintenance.

#### 17.3.2.2 Impacts to Aircraft and Radar

During the operation of the Project, there is the potential for WTGs particularly the rotating blades to interfere with aircraft and aircraft radar. The rotation of the rotor blades makes may reflect signals with a Doppler signature (depending on the wind direction and relative alignment of the wind turbine versus the radar) thereby creating interference on the radar display/screen such as erroneous signals, echoes and other clutters and these could further

create flight safety issues. There is also the potential for WTGs and the OHTL to present an obstacle on flight routes particularly when aircrafts are flying close to the ground i.e., during take-off and landing or where flights are flying low as with military activities.

There are no airports within 50 km, however, there are two helipads located next to the vermiculite mining facilities.

It is understood that CAA will be provided with turbine locations and heights prior to installation.

### **17.3.2.3 OHTL Failure**

In the event that an OHTL tower collapses, for example due to a faulty foundation, there is the potential for electric shock and/or burns, which may lead to serious injuries.

Risks to public safety will be appropriately addressed and prepared for in the operational phase 'Emergency Preparedness and Response Plan' and via appropriate training of staff.

### **17.3.2.4 Security**

The Project constitutes a facility of high importance due to the generation of electricity. The Project will require site-based security at the main entrance and on patrol around the site.

As is consistent with the construction phase, the O&M Contractor will undertake a security risk assessment to determine the appropriate level of security required at the facility. Security arrangements should be guided by the UN Code of Conduct for law enforcement officials, the Voluntary Principles on Security and Human Rights and UN basic principles on the use of force and firearms by law enforcement officials if security personnel will be armed.

In addition to this, security personnel will receive internal training in regard to grievances, reporting such grievances and dialogue with any members of the local community.

### **17.3.2.5 Human Rights Risk**

The risk to human rights abuses during the operational phase will be limited due to the reduced workforce and interaction with local communities. However, the risks will not be entirely eliminated, and mitigation measures will need to be put in place just as in the construction phase.

In addition, the O&M Company will be required to implement a grievance mechanism, conduct consultations and provide information to local communities in line with the SEP that will be submitted alongside the ESIA.

## **GENDER BASED VIOLENCE & HARASSMENT, SEXUAL EXPLOITATION & ABUSE AND SEXUAL HARASSMENT**

Even though there will be reduced workforce during the operational phase of the Project, the risk of GBVH/SEA/SH will remain especially towards women, girls and boys. There will still be a limited level of interaction between the operational phase team and the host communities. As a result, measures will be put in place to ensure that exploitative sexual relationships and unwanted aggressive advances and harassment are prevented and addressed.

### 17.3.3 Mitigation and Management Measures

**Table 17-1 Community Health, Safety and Security Mitigation and Management Measures - Construction Phase**

TOPIC	MITIGATION AND MANAGEMENT MEASURES
<b>Worker Influx</b>	<ul style="list-style-type: none"> <li>Where practical, the EPC Contractor will look to maximise local recruitment.</li> <li>Worker accommodation areas will be managed in accordance with the EBRD and IFC Workers' Accommodation: Processes and Standards. The provision of good quality living accommodation, services and amenities will likely reduce the need for mixing with local communities. Gender aspects will be considered in the worker accommodation.</li> <li>Project induction training will include a section on code of conduct when engaging with local community members. This will include an overview of culturally and religious appropriate measures and etiquette to bear in mind.</li> <li>Sexual harassment or violence in and out of the Project site will not be tolerated and the EPC Contractor will work with local community leaders, gender-based organisations and government officials to ensure that any complaints are addressed in accordance with the law.</li> <li>The EPC Contractor will develop a Worker Influx Management Plan to provide a clear set of actions that will be undertaken for the management and mitigation, monitoring and evaluation of impacts related to worker influx in the Project area.</li> <li>Additional management and mitigation measures will be in accordance with the World Bank guidance note on Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labour Influx (2016).</li> </ul>
<b>Public/Community Health</b>	<ul style="list-style-type: none"> <li>The Health and Safety teams on site will provide advice during training/inductions on exposure to disease including preventative measures e.g., TB, STDs and HIV/AIDS.</li> <li>During construction, staff will have access to medical professionals and suitable medical facilities, which will aim to prevent the spread of diseases internally and externally. Site personnel will only be cleared for work with a medical fitness certificate from an authorised medical centre.</li> <li>The EPC Contractor will prepare a medical evacuation emergency plan with contact details for local ambulance services.</li> <li>Any reportable disease will be diagnosed by the authorised occupation health centre doctor. Diagnosis includes identifying any new symptoms, or any significant worsening of existing symptoms.</li> </ul>



TOPIC	MITIGATION AND MANAGEMENT MEASURES
	<ul style="list-style-type: none"> <li>Any external and internal spreading diseases will be diagnosed and precautions will be taken as per the instructions from the national/ local medical authority.</li> <li>The potential for exposure to water-borne, water-based, vector-borne diseases and communicable diseases as a result from project activities will be avoided or minimised.</li> <li>Potholes will be filled immediately to prevent the breeding of bacteria and parasites that may pose a risk to the health of the communities near the site.</li> <li>The EPC Contractor, in coordination with the local authorities, will conduct awareness campaigns regarding the transmission of STIs in the communities near the Project site.</li> <li>Workers will be provided with free condoms and advice will be given on how to access testing in public hospitals.</li> <li>Information regarding the transmission of HIV/AIDS will be prepared and disclosed in a culturally sensitive manner and targeted towards young adults of consenting age.</li> <li>The Project shall prepare a site Community Response Action Plan which shall define the site action to support community stakeholders in planning, responding and recovering from the COVID-19 outbreak especially when outbreaks are directly linked to the Project workers.</li> <li>Due to the health risk posed by COVID-19, workers will be screened in accordance with the Uzbekistan guidelines and WHO. They will also be provided with PPE and training on how to safely use them during induction and as part of the toolbox talks.</li> <li>If any cases of COVID-19 are reported on site, the EPC Contractor will notify the relevant health officials and isolation of concern individuals performed immediately.</li> <li>The workers will ensure minimal interaction with community members as long as COVID-19 continues to be a health risk. In addition, community members working on the site will be trained on how to ensure proper hygiene when working on the site and when they go home.</li> <li>Working and living conditions will be suitable to ensure the potential for COVID-19 spread is minimised (e.g., appropriately sized living and canteen arrangements).</li> </ul>
Public/Community Safety	<p><b>Impact to Aviation</b></p> <ul style="list-style-type: none"> <li>WTG final positions (coordinates) and height information will be provided to CAA prior to installation/erection of WTGs.</li> <li>The final NOC should be obtained from CAA and Ministry of Defence before the start of construction.</li> <li>If required by CAA, red aircraft lighting will be installed on the hub and/or blade tips of the WTG (to be agreed before the WTGs are erected).</li> </ul> <p><b>Other Public/Community Safety</b></p> <ul style="list-style-type: none"> <li>The employees during the construction phase shall undergo a Code of Conduct training to ensure smooth coordination with the neighbouring community.</li> <li>Risks to public safety will be appropriately addressed and prepared for in the construction phase 'Emergency Preparedness and Response Plan' and training.</li> </ul>

TOPIC	MITIGATION AND MANAGEMENT MEASURES
	<ul style="list-style-type: none"> <li>• The plan will include the appropriate procedure to respond to any such incidents, as well as site specific contact details and details of external agencies who may be required.</li> <li>• Project induction training will include a section on Code of Conduct when engaging with local community members. This will include an overview of culturally appropriate measures and etiquette to bear in mind.</li> <li>• All high-risk areas including fuel storage areas will be secured with internal fencing and will be patrolled by security throughout the day.</li> <li>• Smoking will be prohibited at chemical and fuel storage areas.</li> <li>• Appropriate mechanisms for emergency control (e.g., well-equipped firefighting equipment) will be placed at suitable positions around the site.</li> </ul>
<b>Public/Community Security</b>	<ul style="list-style-type: none"> <li>• The Project will employ its own security staff who will provide 24/7 security control across the Project site and dedicated security staff at gatehouses. Where possible and practical the security staff will be employed from the local communities.</li> <li>• The security staff will be employed based on local regulations.</li> <li>• The EPC will prepare a Security Plan consistent with its Security Risk Assessment.</li> <li>• Security arrangements shall be guided by UN Code of conducts for law enforcement officials, Voluntary Principles on Security and Human Rights and UN basic principles on the use of force and Firearms by law enforcement officials (where firearms are in use). Security personnel will follow a strict code of conduct and will be trained in weapons handling, human rights and receipt of grievances.</li> <li>• Any use of firearms will be in accordance with the Uzbekistan legal requirements.</li> <li>• All vehicles entering the site will require pre-approved clearance and will need to be registered. Project security will record all instances of incoming vehicles.</li> <li>• CCTV will be installed at key locations around the site and at gatehouses.</li> <li>• Appropriate lighting will be provided at gatehouses for security personnel to prevent unauthorised access.</li> <li>• Project personnel will only be provided access to the construction site with valid ID cards and permits to work in line with HSE requirements.</li> <li>• People trying to gain unauthorized access to the site without appropriate permits and PPE will not be permitted, or will be removed from site if identified and an investigation carried out on how they were able to access the site and corrective action taken.</li> <li>• GBVH related grievances must be handled by specially trained professionals in this regard who must apply a victim-centred approach.</li> </ul>
<b>Human Right Risks to Local Communities – Right to Security</b>	<ul style="list-style-type: none"> <li>• Substance abuse prevention and management programs will be provided to workers;</li> <li>• The Project will provide training to local law enforcement staff on management of illicit behaviour;</li> <li>• A Workers' Code of Conduct will be developed and implemented to guide any interaction with local communities.</li> </ul>

TOPIC	MITIGATION AND MANAGEMENT MEASURES
	<ul style="list-style-type: none"> <li>Regular and sporadic site checks with regards to substance abuse will be conducted at accommodation camps whilst respecting workers' freedom of movement rights.</li> <li>Prior to the commencement of construction, local communities will be informed about the risks of entering the Project site</li> <li>Security arrangements at the Project site will be guided by UN Code of conducts for law enforcement officials and UN basic principles on the use of Force and Firearms by law enforcement officials (where firearms are in use). Security personnel will follow a strict code of conduct and will be trained in weapons handling and human rights.</li> <li>The EPC Contractor will develop and implement a Security Plan that will outline expectations with regards to security management.</li> </ul>
<b>Human Right Risks to Local Communities – Right to Health</b>	<ul style="list-style-type: none"> <li>The EPC Contractor will make provisions for suitable health clinic and medical professionals at the Project site.</li> <li>Arrangement should be made with other regional hospitals so that the services to the local communities are not undermined.</li> </ul>
<b>Human Right Risks to Local Communities – Economic Right (Economic &amp; Physical Displacement of Herders)</b>	<ul style="list-style-type: none"> <li>The Project is not expected to negatively impact the livelihood of the local community, including the herder or his family. The herder family will remain a stakeholder in the SEP for the implementation of the Project and will have access to the GRM should any issues need to be raised. Issues will be dealt with on a case-by-case basis.</li> </ul>
<b>Human Right Risks to Vulnerable Groups – Right of Ethnic Minorities</b>	<ul style="list-style-type: none"> <li>EPC Contractor to provide adequate training to the non-local workers in the Project, especially in terms of interaction with the local ethnic minority;</li> <li>Allow locals including residents to report concerns through the Grievance Mechanism;</li> <li>EPC Contractor will adopt a zero-tolerance policy towards unacceptable workforce behaviour towards females or any community member.</li> <li>Project induction training will include a section on code of conduct when engaging with local community members. This will include an overview of culturally and religious appropriate measures and etiquette.</li> <li>Sexual harassment or violence in and out of the Project site will not be tolerated and the EPC Contractor will work with local community leaders, gender-based organizations and government officials to ensure that any complaints are addressed in accordance with the law.</li> </ul>
<b>Human Right Risks to Vulnerable Groups – GBV, SEA &amp; SH</b>	<ul style="list-style-type: none"> <li>The Project Company and the EPC Contractor will conduct a GBV/SEA/SH risk assessment in consultation with relevant stakeholders including women leaders and those working with young adolescent girls and boys. This will also include the identification of potential interventions and risk mitigation measures.</li> <li>A Project-specific GBVH Policy detailing the list of unacceptable behaviour among workers, provisions for reporting, sanctions for perpetrators and available resources &amp; support systems for the victims will be prepared and implemented in accordance with lenders and Uzbek requirements including ACWA Power's Environmental &amp; Social Management System Implementation Manual.</li> </ul>

TOPIC	MITIGATION AND MANAGEMENT MEASURES
	<ul style="list-style-type: none"> <li>• Awareness training will be mandatory for all Project workers regarding the GBV/SE/SH risks and the workers responsibilities and the legal consequences of being a perpetrator.</li> <li>• Training will be provided to the community members on the risks of GBV/SEA/SH and information provided on how to report any cases of GBV/SEA/SH and the services that will be made available to offer support to any of the victims.</li> <li>• Approach towards GBV/SEA/SH prevention, mitigation and response will be survivor centered and ensure confidentiality, dignity and respect.</li> <li>• The Project staff will be trained on how to preserve the safety of the women, girls, boys when interviewing them and collecting information about their experiences on GBV/SEA/SH.</li> <li>• The Project will provide essential services for survivors such as access to counselling services, support groups, legal support etc. at no cost to them.</li> <li>• All determined cases of GBV/SEA/SH will be referred to relevant legal entities in the Project area for further investigation and prosecution.</li> <li>• GBVH related grievances must be handled by specially trained professionals in this regard who must apply a victim-centred approach.</li> <li>• The Project grievance mechanism will be made available to project workers and community members and will ensure that survivors' information is confidential and kept anonymous.</li> <li>• All cases relating to GBV/SEA/SH shall be documented and closed.</li> <li>• The EPC Contractor will prepare and implement a GBV/SEA &amp; SH Prevention and Response Action Plan which will put necessary protocols and mechanisms to address the risks of GBV/SEA/SH and how to address any allegations that may arise in accordance with the World Bank Good Practice Note on Addressing SEA/SH in Investment Project Financing involving Major Civil Works and the EBRD Guidance Note on Addressing GBVH.</li> </ul>
<b>Grievance Mechanism</b>	<ul style="list-style-type: none"> <li>• The Project will implement an appropriate system to allow external parties to raise grievances in regard to the Project.</li> <li>• The Grievance Mechanism will be clearly defined, transparent and accessible to identified stakeholders.</li> <li>• EPC Contractor will appoint a community liaison officer preferably from the local community who will maintain communication with the local leaders and community members.</li> <li>• The grievance mechanism will be confidential and provide referral and support system for any workers reporting cases of GBVH.</li> </ul>
<b>Human Rights Policy</b>	<p>In addition to adhering to the national human rights requirements, the EPC Contractor will put in place a human right's policy in line with the UN Guiding Principles on Business and Human Rights. The statement policy will:</p> <ul style="list-style-type: none"> <li>• Be approved at the most senior level of the company;</li> <li>• Informed by relevant internal and external expertise;</li> <li>• Stipulate the EPC's human rights expectations of personnel, local communities, sub-contractors and other suppliers directly linked to the construction of the project;</li> <li>• Be publicly available and communicated internally and to the relevant stakeholders;</li> <li>• Be reflected in the other policies and procedures to embed it throughout their construction phase activities.</li> </ul>

**Table 17-2 Community Health, Safety and Security Mitigation and Management Measures - Operation Phase**

TOPIC	MITIGATION AND MANAGEMENT MEASURES
<b>Public/Community Safety</b>	<p><b>Wind Farm – Blade and Ice Throw</b></p> <ul style="list-style-type: none"> <li>In order to minimise the likelihood of blade failure, wind turbines that have been subject to independent design verification/certification, and surveillance of manufacturing quality will be selected in accordance with IFC EHS Guideline on Wind Energy.</li> <li>Periodic blade inspections should be carried out and any defects that could affect blade integrity should be repaired immediately.</li> <li>Wind turbines should be equipped with vibration sensors that can react to any imbalance in the rotor blades and shut down the turbine if necessary</li> </ul> <p><b>OHTL</b></p> <ul style="list-style-type: none"> <li>The OHTL towers will be installed in accordance with GIIP.</li> <li>The required HPZ around the OHTL will be implemented.</li> <li>Automatic fault/damage detection system will be installed to enable early detection of any faults with OHTL installation.</li> <li>The tower will be tested for collapse to ensure design and installation is in line with NEGU &amp; GIIP.</li> </ul> <p><b>Wind Farm &amp; OHTL</b></p> <ul style="list-style-type: none"> <li>All risk to public safety will be appropriately addressed and prepared for in the operational phase 'Emergency Preparedness and Response Plan' and training.</li> <li>The plan will include the appropriate procedure to respond to any such incidents, as well as site specific contact details and details of external agencies who may be required.</li> <li>The employees during the operational phase shall undergo a Code of Conduct training to ensure smooth coordination with the neighboring community.</li> <li>Appropriate mechanisms for emergency control (e.g., firefighting equipment) will be placed at suitable positions around the site.</li> <li>A Grievance Redressal Mechanism shall be made accessible to the community to ensure that community members raise grievances to the Project leadership.</li> <li>Sexual harassment or violence in and out of the Project site will not be tolerated and the O&amp;M Company will work with local community leaders and government officials to ensure that any complaints are addressed in accordance with the law.</li> <li>The Health and Safety teams on site will provide advice during training/inductions on exposure to disease including preventative measures e.g., TB, STDs and HIV/AIDS.</li> </ul>
<b>Public/Community Security</b>	<ul style="list-style-type: none"> <li>The Project will employ its own security staff who will provide 24/7 security control across the Project site and dedicated security staff at gatehouses.</li> <li>The security personnel will be regularly trained on GBVH code of conduct including how to handle grievances related to GBVH from the community.</li> <li>All vehicles entering the site will require pre-approved clearance and will need to be registered. Project security will record all instances of incoming vehicles.</li> </ul>

TOPIC	MITIGATION AND MANAGEMENT MEASURES
	<ul style="list-style-type: none"> <li>• CCTV will be installed at key locations around the site and at gatehouses.</li> <li>• Appropriate lighting will be provided at gatehouses for security personnel to prevent unauthorised access.</li> <li>• Project personnel will only be provided access to the construction site with valid ID cards and permits to work in line with HSE requirements.</li> </ul>
<b>Gender Based Violence &amp; Harassment, Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH)</b>	<ul style="list-style-type: none"> <li>• The Project Company and the O&amp;M Company will conduct a GBV/SEA/SH risk assessment in consultation with relevant stakeholders including women leaders and those working with young adolescent girls and boys. This will also include the identification of potential interventions and risk mitigation measures.</li> <li>• Awareness training will be mandatory for all Project workers regarding the GBV/SEA/SH risks and the workers responsibilities and the legal consequences of being a sexual or violence perpetrator.</li> <li>• Training will be provided to the community members on the risks of GBV/SEA/SH and information provided on how to report any cases of GBV/SEA/SH and the services that will be made available to offer support to any of the survivors.</li> <li>• Approach towards GBV/SEA/SH prevention, mitigation and response will be survivor centered and ensure confidentiality, dignity and respect to them.</li> <li>• The Project staff will be trained on how to preserve the safety of the women, girls, boys when interviewing them and collecting information about their experiences on GBV/SEA/SH.</li> <li>• The Project will provide essential services for survivors such as access to counselling services, support groups, legal support etc. at no cost to them.</li> <li>• All determined cases of GBV/SEA/SH will be referred to relevant legal entities in the Project area for further investigation and prosecution.</li> <li>• The Project Grievance Mechanism will be made available to Project workers and community members and will ensure that survivors' information is confidential and kept anonymous.</li> <li>• All cases relating to GBV/SEA/SH shall be documented and closed.</li> <li>• The O&amp;M Company will prepare and implement a GBV/SEA &amp; SH Prevention and Response Action Plan which will put necessary protocols and mechanisms to address the risks of SEA/SH and how to address any allegations that may arise in accordance with the World Bank Good Practice Note on Addressing SEA/SH in Investment Project Financing involving Major Civil Works.</li> </ul>
<b>Grievance Mechanism</b>	<ul style="list-style-type: none"> <li>• The Project will implement an appropriate system to allow external parties to raise grievances in regard to the Project.</li> <li>• The Grievance Mechanism will be clearly defined, transparent and accessible to identified stakeholders.</li> <li>• EPC Contractor will appoint a community liaison officer preferably from the local community who will maintain communication with the local leaders and community members.</li> <li>• The Grievance Mechanism will be confidential and provide referral and support system for any workers reporting cases of GBVH.</li> </ul>
<b>Human Rights Policy</b>	<p>In addition to adhering to the national human rights requirements, the O&amp;M Company will put in place a human right's policy in line with the UN</p>



TOPIC	MITIGATION AND MANAGEMENT MEASURES
	<p>Guiding Principles on Business and Human Rights. The statement policy will:</p> <ul style="list-style-type: none"> <li>• Be approved at the most senior level of the company;</li> <li>• Informed by relevant internal and external expertise;</li> <li>• Stipulate the O&amp;M's human rights expectations of personnel, local communities and other suppliers directly linked to the operational phase of the project;</li> <li>• Be publicly available and communicated internally and to the relevant stakeholders;</li> <li>• Be reflected in the other policies and procedures to embed it throughout the operational phase activities.</li> </ul>

## 17.4 Monitoring

Monitoring of Community Health, Safety and Security will be undertaken as required via the management measures outlined above. For instance, monitoring of the security plan will form part of the wider Environmental and Social Management System internal audits to be undertaken. The following table outlines key indicators for community health, safety and security impacts.

**Table 17-3 Key Monitoring Indicators**

INDICATOR	SOURCE OF INFORMATION	FREQUENCY
Record of any conflict between the workers and community members including any cases relating to sexual harassment	Complaints filed by community members or Project workers	Daily during construction and quarterly during operation
Number of SEA/SH grievances handled through a survivor centred approach	Number of grievances handled and how many cases are referred to legal entities for redress.	Ongoing
Record of average period taken to handle SEA/SH grievances in accordance with lenders requirements and referral to legal entities	Complaints received and the period of time it takes to close them.	Ongoing
Discharging of firearms by security personnel on site	Security personnel/local police	Ongoing in the event the security personnel are armed
Record of human rights violation/complaints from the local communities	Complaints filed by community members in relation to the Project	Ongoing
Record of incidents/accidents and near misses (involving external parties)	Records from daily monitoring procedures on site	Ongoing
Record of any communicable diseases on	Project site clinic or HSE personnel	Ongoing

INDICATOR	SOURCE OF INFORMATION	FREQUENCY
site that could pose a risk to the local communities		
Any suspected cases of COVID-19 on site	Records from daily monitoring procedures on site	Ongoing
Number of grievances closed out	Grievance Management System	Quarterly / bi-yearly
Average time for grievance processing and close out and trends	Grievance Management System	Quarterly / bi-yearly
Number of grievances open, method to submit the grievance and trends	Grievance Management System	Quarterly / bi-yearly
Topics raised in grievances and trends	Grievance Management System	Quarterly / bi-yearly

## 18 LABOUR AND WORKING CONDITIONS

### 18.1 Applicable Requirements & Standards

#### 18.1.1 National Regulations

##### LABOUR AND WORKING CONDITIONS

Regulations and standards relating to labour and working conditions include:

- Labour Code of the Republic of Uzbekistan (1995 as amended on 03.08.2021)
  - This is the key national labour focused legislation which takes into account the interests of the employees, employers and the state. Its main aim is to promote fair and safe working conditions and protect the labour rights and the health of employees. The main health and safety provisions in the labour law include H&S requirements, employees' obligation to comply with H&S standards, procedures and use of PPE, additional H&S measures for disabled employees, reporting and investigating accidents etc.
  - The labour code also specifies collective bargaining through collective contracts and agreements as a way of regulating labour relations and harmonising social and economic interests of both the employer and the employees.
- Law "On the employment of the population: No. 642 of 20.10.2020
- Ordinance No. 30-31 of the Ministry of Labour and Social Security and the Ministry of Health of the Republic of Uzbekistan approving the list of hazardous jobs mentioned in Article 355, for which the employment of persons under the age of eighteen years is prohibited.
- Joint Decree of the Ministry of Labour and Social Protection of the Population (No. 33) and the Ministry of Healthcare (No. 13) of Uzbekistan "On the approval of the list of jobs with unfavourable working conditions where the employment of persons under 18 years is prohibited" registered by the Ministry of Justice of the Republic dated July 29, 2009 No. 1990.
- Decree of the Cabinet No. 133 of 11 March 1997 to approve normative acts necessary for the realization of the Labour Code of the Republic of Uzbekistan.
- Decree of the Cabinet of the Ministers No. 1011 of 22 December 2017 "On Perfection of the Methodology of Definition of Number of People in Need of Job Placement, including the Methodology for Observing Households with Regard to Employment Issues, also for the Development of Balance of Labour Resources, Employment and Job Placement of Population".
- Decree of the Cabinet of the Ministers No. 965 of 5 December 2017 "On the Measures of Further Perfection of the Procedure of Establishment and Reservation of Minimum Number of Job Places for the Job Placement of Persons who are in need of Social Protection and Face Difficulties in Searching

Employment and Incapable of Competing in Labour Market with Equal Conditions".

- Decree No. 964 of 5 December 2017 "On the Measures for Perfection of the Activity of Self-Government Bodies Aimed at Ensuring Employment, Firstly for the Youth and Women".
- SanPin 0372-20 "Temporary sanitary rules and regulations on the organization of activities of state authorities and other organizations"
- SanPin (Sanitary Rules&Norms) 0372-20 (New edition, May 2020) on "Temporary sanitary rules and regulations on the organization of activities of state authorities and other organizations". This local legislation subjects entrepreneurship under conditions of restrictive measures concerning the Covid-19 pandemic.
- Resolution of Cabinet of Ministers No244 "On the approval of the regulations on the procedure for the attraction and use of foreign workforce in the Republic of Uzbekistan" dated 25.03.2019. This resolution provides the overall procedure on how citizens can work within Uzbekistan.

A consultation letter was sent to the Ministry of Employment on 28<sup>th</sup> April 2022 informing them of the Project.

A response from the Ministry of Employment stating that the Project is required to comply with the relevant labour protection and safety requirements in line with the following normative documents:

- Resolution of the Cabinet Ministers of the Republic of Uzbekistan "On further improvement of measures for labour protection of employees' No. 263 dated 15.09.2014;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan "On further development of the market of services in the field of labour protection" No. 246 dated 27.04.2017;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan "On measures to improve the activities of the Ministry of Employment and Labour Relations of the Republic of Uzbekistan" No. 1066 dated 31.12.2018;
- Standard Regulation of the Ministry of Labour of the Republic of Uzbekistan "On the organisation of training and testing of knowledge on labour protection" No.272 dated 14.08.1996;
- Regulation of the Ministry of Labour of the Republic of Uzbekistan "On the development of instructions on labour protection" No.870 dated 07.01.2000;
- The Rules of indemnification for damage caused by injury, occupational diseases or other health-related injuries due to performance of work duties approved by Decree of the Cabinet of Ministers of the Republic of Uzbekistan dated 11.02.2005.

In addition, the Ministry of Employment requires the project to implement other relevant regulatory requirements which are meant to improve labour protection and safety as well as promote good working conditions for employees at the construction site.

In addition to the national labour requirements, the Republic of Uzbekistan has also ratified the ILO conventions as described in Section 3.2.

## **HUMAN RIGHTS**

As a member of the United Nations, Uzbekistan supports and implements all the main international instruments of the United Nations relating to the protection of human rights and freedoms, including UN Universal Declaration of Human Rights, Human Rights Council Resolution No. 30/15 on human rights and preventing and countering violent extremism, Convention on the Elimination of all Forms of Discrimination against Women among others.

Uzbekistan's State Policy on human rights is aimed at preventing violations or any restriction on human rights and freedoms and at establishing the necessary organizational, legal, social, economic, spiritual and moral foundations for the protection of human rights.

In 1995-1996, two independent and effective institutions for the protection of human rights were established in Uzbekistan: The Human Rights Commissioner (Ombudsman) of the Oliy Majlis of the Republic of Uzbekistan and the National Centre for Human Rights. In subsequent years, special structures for the protection of human rights were established in various ministries and departments of the Republic of Uzbekistan.

### Constitution of the Republic of Uzbekistan (1992)

The constitution asserts that "democracy in the Republic of Uzbekistan shall be based upon common human principles, according to which the highest values shall be the human being, his life, freedom, honour, dignity and other inalienable rights."

### The Protection of Women against Harassment and Violence Act (2019)

The Act defines the various forms of violence - sexual, physical, economic, psychological against women. Protection from harassment and violence is defined as a system of urgent measures of economic, social, legal, organizational, psychological and other nature in order to eliminate the danger to women's life and health, to ensure their safety and to prevent repeated illegal actions against them.

Other relevant legislations include:

- The National Human Rights Strategy was approved by Presidential Decree on 22 June 2020. No. PD-6012;

- Law on guaranteeing equal rights and opportunities for women and men (2019);
- The Law on Mediation (2018);
- Law on Public Control (2018); and
- Law on Administrative Procedures (2018).

### 18.1.2 Lender Requirements

#### EBRD

PR2 is applicable to Labour and Working Conditions and has the following key objectives:

- Respect and protect the fundamental principles and rights of workers;
- Promote the decent work agenda, including fair treatment, non-discrimination and equal opportunities of workers;
- Establish, maintain and improve a sound worker-management relationship;
- Promote compliance with any collective agreements to which the client is a party, national labour and employment laws;
- Protect and promote the safety and health of workers, especially by promoting safe and healthy working conditions; and
- Prevent the use of forced labour and child labour (as defined by the ILO) as it relates to project activities.

Concerning dedicated accommodation, compliance is required with:

- IFC & EBRD Workers Accommodation: Processes and Standards (2009).

In regard to human rights:

- According to EBRD's Environmental and Social Policy, EBRD is committed to the respect of human rights in the Project they finance. EBRD is also guided by the International Bill of Human Rights and the eight core conventions of the International Labour Organization.

#### EBRD PR2 Briefing Note (COVID-19)

EBRD has issued a briefing note highlighting some critical areas of concern that clients may need to address in their COVID-19 response planning. The key areas addressed in the briefing note include:

- Other options/alternatives should be assessed before the retrenchment of workers such as voluntary unpaid leave, reduced working hours etc.
- Decisions to reduce labour costs should be taken incrementally and revisited in light of rapidly changing circumstances and levels of support provided by the national government.



- Retrenchment planning should consider the options for re-employment of dismissed workers once the situation improves.
- Companies should consider applying positive discrimination criteria to dismissals, within bounds permissible under applicable labour and social protection laws and regulations in order to protect workers who are most vulnerable i.e. based on gender, ethnicity, age, economic situation, supply chain workers etc.
- Companies should engage with workers and their representatives during the consideration of the different options viable.
- Grievance mechanism will be essential to monitor staff morale, understand how workers are affected and what their concern are and address pressing matters promptly.

**Note:** EBRD notes that the briefing note is not a compliance document and should be taken as a source of information and analysis

### EPFIs

The following applicable IFC Performance Standards aim to identify and ensure that social and economic impacts of a project are addressed in the relevant areas, in particular:

- Performance Standard 2: Labour and Working Conditions;

In accordance with IFC Performance Standard 2 (Labour and Working Conditions) there is a requirement to align with the following conventions:

- ILO Convention 29 on Forced Labour;
- ILO Convention 87 on Freedom of Association and Protection of the Right to Organize;
- ILO Convention 98 on the Right to Organize and Collective Bargaining;
- ILO Convention 100 on Equal Remuneration;
- ILO Convention 105 on the Abolition of Forced Labour;
- ILO Convention 138 on Minimum Age (of Employment);
- ILO Convention 182 on the Worst Forms of Child Labour;
- ILO Convention 111 on Discrimination (Employment and Occupation);
- UN Convention on the Rights of the Child, Article 32.1; and
- UN Convention on the Protection of the Rights of all Migrant Workers and Members of their Families.

In addition, the Project will also be required to adhere to the United Nations Guiding Principles on Business and Human Rights to ensure that it complies with all applicable laws and to respect human rights.

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## IFC Guidance on Gender Based Violence and Harassment (GBVH) in the Construction Sector

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The assessment, prevention, monitoring and response measures in regards to GBVH should be underpinned by the following principles:

- **Survivor Centred:** The rights of GBVH survivors need to be consistently prioritised and used as the starting point for all decisions on efforts to assess, prevent, monitor and respond to GBVH.
- **Safe:** Survivors, witnesses and those who report and seek to address GBVH can be at risk of retaliation, including threatening and violent behaviour, often from those who do not like their position of power being challenged. Companies should prioritise the safety of those who have experienced, witnessed and reported GBVH.
- **Context specific:** All measures need to be rooted in a thorough understanding of the local context. Investors and companies should understand the legal and social context and identify the support mechanisms that are in place.
- **Collaborative:** Companies should seek inputs from a range of internal and external stakeholders to increase the likelihood of broader buy-in and make GBVH prevention more effective.
- **Inclusive:** Companies should recognise the heightened risks of GBVH faced by certain groups who are subject to discrimination and marginalisation. High risk groups often include people with disabilities, single parents, migrants and ethnic minorities and sexual and gender minorities. The system should also account for illiterate or non-literate people who may not be able to access written information on GBVH reporting mechanisms.
- **Integrated:** Processes, efforts to assess, prevent, monitor and respond to GBVH needs to be integrated as much as possible into existing processes and management systems, such as occupational health safety, security management systems, environmental and social management systems (ESMS) and human resources (HR) policies and procedures.
- **Non-discriminatory:** All survivors need to be listened to and treated equally and promote diversity in the work place.
- **Well-informed:** Companies should draw on relevant expertise when developing prevention and response measures. The grievances mechanism and investigation procedures should be set up to ensure they are appropriate, relevant and safe in the local context.

According to the guidance, the benefits of addressing GBVH include:

- Improves workers' physical and emotional wellbeing and strengthens occupational health and safety.
- Avoids reputational damage, financial risks and legal liabilities for companies, investors and construction contractors.

- Builds relationships and social license to operate in communities. This can result from regular dialogue to understand and track project GBVH risks as well as the effective use of measures to prevent and respond to GBVH.
- Broadens the pool of potential workers that companies can draw upon, including women workers from nearby communities because of lower perceived risk of GBVH.

#### Equator Principles Guidance on Implementation of the Equator Principles During the Covid-19 Pandemic

The guidance recommends that the borrower should consider the following in the engagement of workforce and management of risks:

##### *Engagement of Workforce*

- Communicate its approach to COVID-19 management to its workforce (including contractors) and provide information and advice about the virus.
- Engagement methods should ensure the ability to provide frequent updates with a central information communication network that allows workers to access all the latest information and guidance.
- Consider the need for a 24-hr hotline.
- Design communication in a way that avoids risks of stigma associated with infection in line within available good practice.

##### *Managing Health Risks*

It is recommended that the borrower shall develop a range of actions/procedures to manage workers risks. These procedures must align with the latest guidance/requirements at national/regional levels and WHO guidelines. It should also ensure that up to date information is maintained at the Project level and liaise with national/local authorities as applicable.

##### *Welfare and Livelihoods*

Where travel restrictions lead to workers remaining on site for longer rotations, fatigue management procedures are recommended. The following measures are also recommended in instances where workforce reduction maybe required:

- Consultation with workers/representatives during the entire process of evaluating viable options.
- Options for avoiding redundancy should be considered in the first instance (e.g. paid/unpaid leave, reduced hours/pay) with retrenchment taken as the last option.
- Reduction in workforce should be undertaken incrementally where possible and regularly reviewed.

Consideration should also be given to risks posed to vulnerable workers i.e. casual workers, woman, workers with childcare issues, supply-chain workers and their needs and support provided as required.

## 18.2 Baseline Conditions

### CONSTRUCTION LABOUR IN UZBEKISTAN

Uzbekistan has achieved steady economic development over the past few decades, with the expansion of private sector businesses and progressive policy reforms geared towards the country's transition to a market-based economy. The country's labour force has grown at a rate of 350,000 to 370,000 people per year. Moreover, work and education draw many rural residents to the cities, especially Tashkent and Andijan. Daily migration has been reported to influence the employment rate and culture of rural residents, besides improving the ties between rural and urban communities.

The construction industry is amongst the leading labour-intensive contributors to the national economy, other such sectors being agriculture and manufacturing. In addition, the cross-cutting service sector holds the most potential for job creation. The construction sector, along with agriculture and industry employ about 60% of the labour force accounting for Small to Medium Enterprises (SMEs), with the remainder of labour engaged in the services sector. The leading demographics for informal labour within the country's construction sector and other industries are males, rural residents, and workers with relatively low educational attainment. With regards to the gender distribution, construction represents the second most dominant sector for male recruitment, with 25% of the national male labour employed in construction. Conversely, only 0.6% of the national female labour have been shown to hold occupations within the construction sector (Anderson et al., 2020).

### INDECENT WORKING CONDITIONS

The prevalence of indecent working conditions across different economic sectors in Uzbekistan is not well documented. Despite the paucity of publicly available information in this regard, a review of literature offering highlights on labour conditions within the country's cotton production sector was carried out.

Cotton production in Uzbekistan continues to rank among the most exploitative enterprises, globally. About 90% of the countries cotton plantations utilize manual labour for cotton picking, and the majority of these estates operate with forced labour. Cotton harvesting is performed in harsh climatic conditions, with exposure to hazardous agrochemicals such as pesticides, herbicides and defoliants resulting from a widespread inadequacy of PPE. Employed labourers are made to work for long working hours with little to no weekly and monthly time off. During

the harvesting season, labourers are accommodated on on-farm facilities, most of which lack essential services such as water supply, air conditioning, food provisioning, communication and medical services (Association of Human Rights in Central Asia, 2010).

Many employees had official part-time or low-income jobs and many continued to work informally. In April 2021, the International Monetary Fund (IMF) estimated the informal sector employed approximately 40% of the workforce and produced one-third of the GDP. The government worked to shift more of the economy from informal to the formal economy and to provide labour and social protections to those working informally. Despite an increase in the number of labour inspectors in prior years, the Ministry of Employment and Labour Relations lacked adequate staff to enforce compliance and prevent many violations in the informal sector. The most common labour violations were working without contracts, receiving lower than publicly announced payments, delayed payments, and substandard sanitary or hygienic working conditions.

#### **FORCED LABOUR**

According to the latest Trafficking in Persons Report issued by the United States Department of State, Uzbekistan has not yet attained full compliance with minimum standards for the elimination of human trafficking, although significant progress towards these standards has been realised. In 2019, there were 95 reported victims of human trafficking, 89 of whom were victims of sexual exploitation. While most of the victims were exploited abroad, 15 endured exploitation within the country. The report highlights that Uzbekistan's efforts include steps to end to the systematic mobilisation of students, teachers, and health care personnel for the annual cotton harvest, and granting international, third-party observers' unimpeded access for monitoring purposes. According to 2017 data from Uzbek Ministry of Internal Affairs, out of 501 victims of human trafficking, 303 were women, 198 were men and 61 children. In 2018, the victims included 147 women, 103 men and 41 children. In 2019, the victims of human trafficking included 87 women, 3 men and 35 children.

In July 2019, a Decree of the President of the Republic of Uzbekistan titled Additional Measures to Further Improve the System of Combating Trafficking in Persons and Forced Labour, entered into force. It transformed the Interdepartmental Commission of the Republic for Combating Human Trafficking into a National Commission under the guidance of the President of the Senate. The Commission comprises two sub-committees chaired by the Ministry of Internal Affairs and the Ministry of Employment respectively. Regional commissions were created in each of the Country's regions and a national rapporteur was eventually appointed.

In August 2020, the country's 2008 law on human trafficking was amended as new concepts, preventive measures, and a procedure to identify victims of human trafficking (including minors and their rights), were introduced. While listing the main policy lines in this sector, the law provides a specific definition of the status of the National and Territorial Commissions for

combating human trafficking and forced labour, as well as the powers of the Council of Ministers. The relevant government agencies include the General Prosecutor's Office and the Ministry of Employment and Labour Relations. A new chapter on human trafficking prevention has been introduced in the legislation, with measures ranging from ongoing monitoring and awareness raising campaigns on dangerous situations to the development and implementation of educational programs in public and private educational establishments. The Ministry of Internal Affairs will create a unified database for human trafficking crimes, with information on traffickers, victims and the various types of exploitation. The new law introduces a two-stage procedure to identify the victims of human trafficking. When individuals are granted the status of victim of human trafficking they are entitled to rehabilitation and social integration programs, according to the outcome of the final investigation carried out by the Territorial Committee (United States Department of State, 2021).

### CHILD LABOUR

In 2019, Uzbekistan achieved appreciable progress in action towards the elimination of the worst forms of child labour. The government took active measures to prevent the use of child labour in the cotton harvest, including by introducing criminal penalties for repeat violations of hazardous work prohibitions, doubling the number of labour inspectors, and conducting extensive awareness-raising on child labour laws and penalties for violations. The government also established a new National Commission on Combating Trafficking in Persons and Forced Labour and adopted a new roadmap to combat trafficking in persons and forced labour. However, children in Uzbekistan engage in the worst forms of child labour, including in commercial sexual exploitation. Although the government made meaningful efforts in all relevant areas, laws prohibiting the commercial sexual exploitation of children do not meet international standards. Uzbekistan also has not carried out a national child labour survey to determine the prevalence of child labour in sectors other than cotton production.

Surveys conducted by UNESCO and ILO have shown that about 5% of children in Uzbekistan are engaged in work during studies, and 4.3% are fully devoted to employment. Whilst the surveys have indicated that children below the age of 18 years are chiefly employed in the agricultural and service industries, children were also shown to engage in sex trafficking transnationally, and also internally in brothels, clubs, and private residences. Children in institutions were also shown to be vulnerable to sex trafficking. The table below provides an overview of the sectors and occupations reported to employ minors in Uzbekistan.

**Table 18-1 Sectors and Work Streams Employing Child Labour in Uzbekistan**

SECTOR/ CATEGORY OF LABOUR	ACTIVITY
Agriculture	<ul style="list-style-type: none"> <li>- Cultivating silk cocoons;</li> <li>- Preparing land for crop planting.</li> </ul>
Services	<ul style="list-style-type: none"> <li>- Vending;</li> </ul>



SECTOR/ CATEGORY OF LABOUR	ACTIVITY
	<ul style="list-style-type: none"> <li>- Car washing;</li> <li>- Begging;</li> <li>- Collection of scrap metals;</li> <li>- Refurbishing school grounds and facilities;</li> <li>- Vending in markets.</li> </ul>
Categorical Worst Forms of Child Labour	<ul style="list-style-type: none"> <li>- Commercial sexual exploitation, sometimes as a result of human trafficking;</li> <li>- Forced labour in cultivating silk cocoons;</li> <li>- Forced labour in construction, non-cotton agriculture, and cleaning parks, streets, and buildings.</li> </ul>

With regards to child labour in agriculture and the cotton cultivation sub-sector in particular, the Government of Uzbekistan abolished the oppressive quota system that governed cotton production in some parts of Uzbekistan in 2020. Under the pre-existing cotton production quota system, regional and local officials were mandated to mobilise sufficient labour to meet production targets assigned to farmers, and child workers were recruited with onerous working conditions. Vestiges of child labour in cotton farming are reported to employ children in a supporting capacity, whereby older children assist in harvesting to supplement household income (United States Embassy in Uzbekistan, 2022).

The following table provides a summary of key mechanisms for the Government's coordination of efforts towards the eradication of child labour in Uzbekistan.

**Table 18-2 Mechanisms for Governmental Coordination of Child Labour Eradication Requirements Set out in Uzbekistan's Legal Framework**

SECTOR/ CATEGORY OF LABOUR	ACTIVITY
National Commission on Combating Trafficking in Persons and Forced Labour (National Commission)	<ul style="list-style-type: none"> <li>- Coordinates state and local entities' efforts to combat trafficking in persons and forced labour;</li> <li>- Analyses and monitors efficacy of government programs to address trafficking in persons and forced labour;</li> <li>- Organises international cooperation on combating human trafficking and forced labour;</li> <li>- Provides legal and policy recommendations for improvement of government efforts in these areas.</li> </ul> <p>Chaired by the National Rapporteur on Combating Trafficking in Persons and Forced Labour. Comprises the two sub-commissions on combating human trafficking and on forced labour, respectively. The Minister of Internal Affairs heads the Sub-Commission on Combating Trafficking in Persons and the Minister of Labour heads the Sub-Commission on Combating Forced Labour. In 2019, the National Commission drafted and adopted a roadmap to combat trafficking in persons and forced labour, and roadmaps for the cotton harvest, a national plan for work with international organizations, and a media plan.</p>

SECTOR/ CATEGORY OF LABOUR	ACTIVITY
National Rapporteur on Combating Trafficking in Persons and Forced Labour (National Rapporteur)	<p>Chairs the National Commission on Combating Trafficking in Persons and Forced Labour.</p> <ul style="list-style-type: none"> <li>- Reports annually to the President on trafficking in persons and forced labor issues, government efforts to punish perpetrators, and services for victims of human trafficking and forced labor crimes.</li> <li>- Conducts public awareness-raising activities related to human trafficking and forced labor. (35) In 2019, the National Rapporteur convened the National Commission monthly.</li> </ul>
Local Commissions for Combating Human Trafficking and Forced Labour (Local Commissions)	<ul style="list-style-type: none"> <li>- Ensure timely and rigorous implementation of all laws and regulations, including those issued by the National Commission, related to trafficking in persons and forced labour.</li> </ul> <p>Local Commissions mirror the structure of the National Commission, with sub-commissions on trafficking in persons and on forced labor, respectively. Local Commissions are chaired by the regional hokim (governor) and provide monthly reports to the National Commission.</p>

## OCCUPATIONAL HEALTH AND SAFETY

The most common violations committed by private sector employers were violations of wage, overtime, and occupational health and safety standards. Although regulations provide standards for workplace safety, workers reportedly worked without necessary protective clothing and equipment at some hazardous job sites. More specific information was not available on sectors in which occupational safety violations were common, as well as on specific groups of workers who worked in dangerous conditions or without needed safety equipment. In March 2020 the country joined the Commonwealth of Independent States' Interstate Council for Industrial Safety to improve its industry safety standards (United States Department of State, 2021).

## 18.3 Potential Impacts, Mitigation, Management & Residual Impacts

### 18.3.1 Construction Phase

#### 18.3.1.1 Occupational Health and Safety

Common activities undertaken during construction such as the movement of heavy machinery, excavation, handling of chemicals, works undertaken at height etc. can introduce significant risk to the health and safety for the associated workforce. Risks are more likely for those who are not familiar with the type of works undertaken and the associated hazards.

The type of hazards attributable to a construction site will vary significantly depending on the construction methods employed and the degree of control implemented by the EPC and affiliated sub-contractors. It is therefore of the utmost importance that the EPC and sub-contractors demonstrate consideration of health and safety risks as part of their chosen construction methods and that these risks are appropriately mitigated.

As occupational health and safety is a risk rather than a potentially defined impact, its significance has not been assessed further in this ESIA. Health and safety risks to the site workforce will be managed through effective risk assessment, and the development and implementation of an Occupational Health & Safety Plan.

### **18.3.1.2 Health Risks Associated with COVID-19**

The COVID-19 pandemic poses potential risks to the health and safety of the workers and the development of the Project. It is expected that there will be approximately 150 workers at the peak of the Project construction phase. These workers will be sourced locally but will also include migrant workers from other regions of Uzbekistan and from other countries and thus heightening the risk of infection (i.e., some workers may come from regions/countries with higher COVID-19 infection cases). Workers working in close proximity or confined spaces increases the risk of infection. Risk of exposure will also be potentially high in shared accommodation areas, canteens and transportation buses. The EPC Contractor will therefore be required to conduct a COVID-19 Construction Risk Assessment which must be regularly updated in line with national/local and WHO requirements and guidance.

### **18.3.1.3 Human Right Risks to Workers**

#### **RIGHT TO WORK, FORCED LABOUR, RIGHT TO ADEQUATE STANDARD OF LIVING, NON-DISCRIMINATION**

According to Article 14 of the Uzbekistan Labour Code, every citizen of the Country as well as foreign citizens and stateless persons that have reached working age are eligible for employment and signing of employment contract with an employer. Article 16 of the Labour Code and Article 37 of the Constitution states that everyone has the right to work, including the right to choose their occupation, to fair working conditions and to the protection against unemployment. Resolution No. PP-3913 dated August 20<sup>th</sup> 2018, requires reforms in the labour sector in order to protect labour rights, prevent and eradicate forced labour in Uzbekistan. In addition, the Resolution provides enhancement of national labour legislation in line with conventions and recommendations of the International Labour Organisation.

The Uzbek requirements are mostly aligned with lenders and ILO requirements, however, the main challenge relates to enforcement and implementation. For instance, even though

progress has been made towards ending forced labour (especially in the cotton industry) challenges still persist (Uzbek Forum for Human Rights, 2020).

In relation to the Project, there will be approximately 150 workers during the construction phase. The local workforce will be encouraged to apply for different jobs available depending on skills and qualifications of the local people. During recruitment, there shall be no discrimination based on a person's gender, race, religion, disability, political opinion, etc. and every person will be given equal opportunity and treated fairly.

Labour exploitation on construction sites unfortunately has become a reality in some parts of the world. Inequalities in income, education and opportunities has led to opportunistic, immoral practices with labourers and site staff suffering as a consequence of the exploitation. Examples from other projects within the region have shown that there can be instances of forced labour, labour with poor contracting conditions, or lacking processes in place to manage such elements. This is a potential impact for the Project, especially for contract staff, or those of sub-contractors.

To ensure the wellbeing of all staff associated with the Project, the EPC and associated subcontractors will need to plan for necessary provisions relative to the requirement of the required workforce. This includes carefully safeguarding risks through policy and internal processes (including monitoring and audit) and the provision of appropriate labour accommodation plans and mechanism for inspections and corrective actions.

The EPC Contractor shall adhere to good practice measures regarding worker welfare on and off site.

Risks associated with worker condition and worker welfare during construction will be managed through effective Project planning, and the enforcement of fair and just treatment throughout the construction phase.

### **CHILD LABOUR**

Children under the working age (18 years) as established in the Labour Code will not be employed at the Project site. However young persons (16 years of age) can be engaged for light work i.e., work that will not impact the process of learning and will not impact the physical and mental health & moral/social development of the young person.

EBRD and EPFI's require the Project to comply with all relevant national laws or international labour standards regarding employment of minors, whichever provides a higher degree of protection for the child. According to PR2 and PS2, young people below the age of 18 years should not be employed for hazardous work. This is in line with Uzbek and ILO requirements.

During the recruitment process, the EPC Contractor & associated subcontractors shall adhere to all requirements regarding employment of underage workers on and off site. Where child labour is discovered in the subcontractor or supply chain workforce (for example young persons 16 years of age working in a hazardous environment), the Project shall undertake the necessary steps in accordance with Uzbek Labour Code and ILO Convention 182 on the Worst Forms of Child Labour so that dismissing the child or ending the child's contract will not impact other human rights (right to security, right to privacy) and result in the child being exploited in other ways.

#### **WAGES, WORKING HOURS, RIGHT TO REST AND JOB SECURITY**

Although not expected, there is a risk that workers may be requested to work excessive hours and possibly without overtime pay. It is noted that Article 115 of the Labour Code states that normal working hours should not exceed forty-hours per week in a six-day working week duration. In addition, overtime may only be allowed with the consent of the worker and compensation provided.

The Project Company and EPC Contractor will ensure that all workers, regardless of rank, gender or religious affiliation etc are paid a fair wage and equal remuneration for work of equal value without discrimination. In addition, remuneration must be enough for workers to be able to live a decent life.

Job security for construction workers will only be for the period when construction is undertaken and workers will be employed on contractual basis and as such no retrenchment is expected to occur. The Project Company and the EPC Contractor will ensure that all workers are informed on the nature of their contracts, duration so that they understand the start and end period.

#### **WORKERS' RIGHT TO HEALTH**

It is expected that there will be approximately 150 workers at the peak of the Project construction phase as such there are potential risks for the spread of communicable, sexually transmitted diseases and COVID-19. There is also a likelihood of injury when different work processes are being undertaken. As such, and due to the remote location of the Project site, the EPC Contractor will be required to provide workers with access to medical care. This may include the provision of a site-based clinic with a nurse or trained first-aid provider or access to an ambulance that can transport workers to larger district hospitals.

In case of outbreaks such as typhoid, cholera etc, the EPC Contractor will be required to notify the local health department and conduct adequate screening/tests for all workers in line with national/local requirements.

There is no limit to sick leave in Uzbekistan for employees. However, in the case of prolonged illness the employee will be subject to a special medical expert commission which issues a conclusion on the employees' ability to continue working. According to Article 285 of the Labour Code, sick leave allowance should range from 60 to 100% of the salary depending on the employee's payment of state social security contributions. In case of labour related injury or occupational illness, the workers will be compensated based on 100% of their average earnings.

#### **COLLECTIVE BARGAINING AND FREEDOM OF ASSOCIATION**

Workers shall be allowed to be involved in collective bargaining in accordance with Article 30 of the Labour Code as far as they comply with the established requirements for collective bargaining and agreements. In Uzbekistan, trade unions are more common for state owned companies and not very common in private companies (Dentons, 2020). Regardless of this, the EPC Contactor and associated subcontractors will not prevent workers from forming associations or joining trade unions depending on their preferences.

#### **WORKERS' FREEDOM OF MOVEMENT**

Workers will not be restricted to the accommodation camps and will be allowed to move freely within the community and travel to outside the project area, region and country. However, in order to avoid cultural or religious conflicts with the local communities due to alternative ideals, behaviour and cultural practices that some of the workers might have, adequate training (cultural sensitization training) will be provided to the non-local workers prior to interactions with the local community.

Due to the ongoing COVID-19 pandemic, movement of workers to their families or home region/countries may be restricted which could leave some feeling isolated, fatigued and could lead to mental health issues if not properly addressed.

### **18.3.1.4 Potential Gender Risks Associated with the Project**

#### **GENDER BASED VIOLENCE AND HARASSMENT**

Influx in workers from outside the Project region will increase the likelihood of Gender Based Violence and Harassment (GBVH), Sexual Exploitation & Abuse (SEA) and Sexual Harassment (SH). The construction workers are likely to be predominantly young male coming from other regions of Uzbekistan and outside the country. These workers will be away from their families and removed from their normal social spheres. This could potentially result into peer pressure and involvement in unlawful behaviour such as harassment of local women, young girls and boys or women within the Project workforce. Such behaviour can lead to increase in



exploitative sexual relationships and unwanted aggressive advances and harassment. This could also lead to disintegration of relationships in local households impacted by GBVH/SEA/SH.

During the construction phase, workers will also be vulnerable to various forms of harassment, exploitation, and abuse, aggravated by the traditionally male working environment. Incidents of GBVH/SEA/SH are likely to be committed by co-workers or construction supervisors and can be attributed to gender stereotypes about the sexual availability of female construction workers. In addition, income earning opportunities for women through direct employment during the construction phase or through indirect employment has the potential to increase household tensions and expose women to harassment and violence in their homes or communities.

Some of the male workers who will be transporting Project machinery and equipment and goods will also be involved in long distance travel which in some cases will be between different countries. There is a risk that they can also be involved in GBVH/SEA/SH on the routes they use and at stops associated with the Project even if it is outside the Project boundary.

#### **GBVH/SEA/SH IN ACCOMMODATION FACILITIES**

It is understood that the EPC Contractor (and possibly the sub-contractors) will provide accommodation facilities for their workers on site. This presents a safety risk especially for women who may be working at the Project and living within the designated accommodation areas and their use to common areas such as the cafeteria.

To address such risks, the EPC Contractor will be required to provide safeguards such as locating women accommodation facilities in a separate compound from the men, provision of locks on doors, separate sanitation facilities, adequate lighting etc. In addition, since majority of the population in Uzbekistan is Muslim, the EPC Contractor will provide options for separate social facilities for the men and women.

#### **WAGE DISCRIMINATION BASED ON GENDER**

In an effort to promote wage parity between men and women, the government of Uzbekistan ratified ILO's Convention No. 100 (Equal Remuneration for Men and Women Workers for Work of Equal Value). However, the problem is that women tend to be concentrated in low-status sectors which leads to low-wage jobs. In addition, the construction industry is predominantly male and women may only be offered low-paying jobs such as cooks, cleaners etc.

As such, the EPC Contractor will be required to provide access to recruitment opportunities for women based on their qualifications and equal salaries as their male counterparts undertaking

work of the same value. In addition, a policy of equal pay will be included in the EPC Contractor's HR Policy or as a stand-alone.

#### **DISCRIMINATION BASED ON EMPLOYMENT BENEFITS AND GUARANTEES**

Traditional norms in Uzbekistan associate women roles to care givers especially in rural areas. Women who intend to pursue a career are still expected to balance between their job obligations and family life which ultimately affect their career paths. In addition, employers may potentially prefer to employ men over women because most of the employment family benefits and guarantees are associated to women. For instance, according to Article 233 of the Labour Code, women employees are entitled to paid maternity leave for a period of 126 days and in some cases childcare allowances are also provided. This includes 70 days given before the expected birth of the child and 56 after the birth. In case of complications, maternity leave can be extended by an additional 14 days. Even though men can also claim similar benefits in paternity leave, childcare (especially in rural areas) is still seen as a woman's job.

As such, women of childbearing age may face potential discrimination during the recruitment process because the EPC Contractor may want to avoid providing the benefits and guarantees relating to maternity or childcare. To mitigate this, the EPC Contractor will be required to include the benefits and guarantees for both men and women in the HR policy with a clear commitment to non-discrimination during the recruitment process.

#### **DISCRIMINATION BASED ON SEXUAL ORIENTATION**

The Uzbek laws and regulations prohibit discrimination in the workplace based on race, gender and religion. However, it is noted that there are no provisions that provide protection to workers against discrimination because of their sexual orientation or gender identity. As such, any workers who have a different gender identity and/or sexual orientation may face discrimination for not conforming to societal and/or religious norms. They may also be at a high risk of violence and harassment as a way of punishing them to conform to prevailing societal views.

To address such risks, the EPC Contractor's HR policy will include a non-discrimination policy and a code of conduct, GBVH policy applicable to all employees and sub-contractors.

#### **18.3.1.5 Supply Chain Risks**

The engagement of suppliers will present potential risks relating to labour and working conditions such as:

- Child labour, forced labour, gender- based violence and sexual abuse, exploitation and harassment
- Lack of written contracts for workers;
- Labour rights violations including poor working conditions and poor terms of agreement for female employees, overtime work without pay etc;
- Health & safety issues for workers and local communities;
- Risks associated with the use of migrant labour and ethnic minorities;
- Risks to freedom of movement e.g., being able to leave worker accommodation;
- Human rights risks associated with COVID-19 restrictions such as movement restrictions etc; and
- impact on the environment relating to pollution of water supplies, soil and air.

In order to assess these risks to the Project, ACWA Power requested Envision (the WTG Supplier) to undertake a supplier's risk assessment for their suppliers. This is to ensure that the Project complies with Project requirements on supply chain. In turn, Envision commissioned SGS to undertake the assessment.

SGS has mapped suppliers for the Project which include include Envision (Tier 1 – turbine OEM Manufacturer) and the rest as Tier 2 – component manufacture & Tier 3 (key material provider such as steel rod & plate, cast iron, fibreglass, aluminium and copper). The scope of the assessment included the following:

#### **INITIAL SCREENING**

A review of all labour & working conditions relevant documentation available in the public domain on Envision and Envision's core suppliers including but not limited to union complaints, recent legal cases/appeals, public allegations including NGO claims, etc.

#### **DESKTOP SCREENING/ONLINE ASSESSMENT**

Desktop screening of labour, HSE risks through review of the suppliers' policies/procedures and public concerns/court case results etc.

- Online screening of labour, HSE risk through the review of the suppliers' policies and procedures and public concerns/court cases results and employee feedback was undertaken. This online screening involved the use of worker questionnaire that comprised of question relating to:
  - Recruitment;
  - Discipline process;
  - Forced and Child Labour;
  - Overtime work;

- Freedom of association/role of the trade union
- Worker wellbeing;
- Anti-discrimination, sexual harassment and equal opportunity;
- Health & safety concerns; etc.

#### **SITE BASED ASSESSMENT**

Site based assessments were undertaken for suppliers that were not able to participate in the desktop/online screening and involved visits to supplier offices, accommodation and other facilities and the review of supplier's policies, plans, procedures, internal reports to assess working conditions and workforce management.

The result of the desktop screening and site assessment is outlined below:

- All suppliers meet the requirements of national laws & regulations;
- There is no evidence of "Zero Tolerance" activities such as child labour and forced labour for all suppliers
- The management and executive levels of the suppliers have an adequate understanding of the basic requirements of labour and working conditions according to national legislations.
- The majority of the suppliers have established related rules and policies, which defined some of the requirements of protecting employees and providing safe working conditions.
- The suppliers have carried out various training activities, to improve the awareness and ability of relevant personnel on protecting workers.

In addition to the above, Envision implements a Supplier Code of Conduct that is a total-chain initiative, and as such is applicable to all suppliers and their subsidiaries, affiliated parties, sub-contractors, and third-party intermediaries. The Supplier Code of Conduct has comprehensive provisions covering strict zero-tolerance policies for forced labour and child labour, as well as wage standards, health and safety standards, among other provisions in line with the UNGPs, the Universal Declaration on Human Rights and ILO Core Standards, in addition to requiring adherence to local/national laws. Envision also publishes a statement on Modern Slavery & Human Trafficking; this entails commitments to ensure that there is no modern slavery or human trafficking in their supply chains or business activities. Review of documents proved that Envision's policies are generally in line with the international requirements for supply chains.

Although, the result of the desktop screening and site assessment identified Zero Tolerance to forced and child labour issues in Envision and its supply chain, a number of major non-compliance points were identified. These non-compliance points largely relate to inconsistencies in policies against the requirements and implementation practices, overtime

issues, gaps in HSE processes, disciplinary and grievance mechanism or employee record-keeping systems.

It is noted that ACWA Power will only contractually engage one EPC Contractor. The EPC will be contractually obligated to follow ACWA Power's Chartered Institute of Procurement & Supply (CIPS) procurement system which requires that all contractors and suppliers engaged by the EPC are vetted and meet ACWA Power's procurement policies as well as national and lender requirements.

The EPC Contractor will be responsible for undertaking due diligence and audits to ensure that its contractors and suppliers comply with the applicable national and lenders requirements. In addition, on-going vetting of suppliers by the EPC will be monitored during the quarterly independent E&S audits with specific questions relating to the supply chain.

During the assessment, it was discovered that Envision had established and implemented the supplier management system based on the "Envision Energy Code of Conduct for Suppliers", all suppliers will be required to sign the agreement as it plays an important role in strengthening supplier management at Envision.

### 18.3.2 Operational Phase

#### 18.3.2.1 Occupational Health and Safety

The risks associated with the operational phase of the Project are anticipated to be less than the construction phase due to reduced site activity and requirements for heavy plant and machinery.

There will be occupational health and safety risks attributable to the operational phase associated with maintenance and inspection requirements. Maintenance and inspection will also require the use of site vehicles and activities that pose risks to human health and safety.

During operation of the Project, there is the risk of working at height to undertake any maintenance works. Workers may also be required to work in confined spaces such as the nacelle (the wind turbine component that contains the electrical components) and other sections of the tower to conduct inspection, maintenance, replacement or repairs. As such, there is the risk that O&M workers will be exposed to electrical hazards (electrical shock & fire) during maintenance works.

With regards to the operation of the OHTL, there is a risk of electrocution of O&M personnel due to direct contact or indirect contact via tools, ladders or vehicles with high voltage electricity. There is also a risk of falling while working at height. O&M personnel will ensure

deactivation of transmission line prior to work on these lines and where live work will be undertaken, this would be conducted by trained workers only. Fall protection equipment and adequate training will also be provided to maintenance workers to reduce the risk of falling from height.

A structured GRM will be implemented at the Project level in multiple languages anonymously (online and hardcopy) so that workers have access to express their concerns. The human resources department shall be responsible for implementing the GRM for the facility.

The severity and likelihood of risks during the operational phase will be dependent on the frequency and requirements for planned and unplanned maintenance. The operation and maintenance team will need to ensure that a robust plan is in place to appropriately manage these risks.

### **18.3.2.2 Health Risks Associated with COVID-19**

Although the number of workers expected during the operational phase of the Project will be much lower at approximately 10 – 15 permanent people, the risk of COVID-19 infection cannot be ruled out. Based on the prevailing conditions, the O&M Company will be required to conduct a COVID-19 Operational Risk Assessment which will be regularly reviewed based on new information and guidelines/requirements provided by the national government and WHO.

### **18.3.2.3 Human Right Risks to Workers**

#### **FORCED LABOUR AND CHILD LABOUR**

As the vast majority of staff will be direct employees of the Project Company or O&M Company the potential risks associate with worker exploitation are expected to be limited due to consistent processes in place as part of the respective HR management systems, assuming they are appropriately designed and have adequate resources. However, where there is an agency/contract staff the risks of exploitation (particularly forced and child labour) may be more prevalent.

#### **RIGHT TO ADEQUATE STANDARD OF LIVING**

No long-term accommodation requirements are anticipated for the operational phase of the Project. However, as with construction, operational activities will need to plan for and enforce just and fair treatment of operation and maintenance staff (including any engaged sub-contractors) in accordance with lender requirements and relevant Uzbekistan national



requirements. Allowance will also need to be made for site staff welfare facilities including sanitation, rest, recreational and medical facilities

#### 18.3.2.4 Potential Gender Risks

Although there will be reduced workforce during the operational phase of the Project, the risk of gender issues relating to GBHV/SEA/SH, wage discrimination and access to employment benefits etc will remain. However, as with construction, operational activities will need to plan for and enforce just and fair treatment of operation and maintenance staff (including any engaged sub-contractors) in accordance with lender requirements and relevant Uzbekistan national requirements. Gender needs will be considered for welfare facilities including sanitation, rest, recreational and medical facilities. All the mitigation and management for gender risks during the construction phase will also be applicable for the operational phase of the project.

In addition, the O&M Company will also be required to have a HR policy with clear provisions for non-discrimination, code-of conduct and a GBVH policy.

#### 18.3.3 Mitigation and Management Measures

**Table 18-3 Labour and Working Conditions Mitigation and Management Measures – Construction**

POTENTIAL IMPACT	MITIGATION AND MANAGEMENT MEASURES
<b>Occupational Health and Safety</b>	<ul style="list-style-type: none"> <li>Workers will be provided with a safe and healthy work environment, considering inherent risks and specific classes of hazards associated with the Project.</li> <li>The EPC Contractor will implement and maintain an OHS management system taking into account specific risks associated with the Project, legal requirements and duty of care.</li> <li>The EPC Contractor will be responsible for ensuring that all affiliated sub-contractors comply with the OHS management system. The OHS management system will be in-line with recognised international best practice and as a minimum, this plan will include: <ul style="list-style-type: none"> <li>Means of identifying and minimising, so far as reasonably practicable, the causes of potential H&amp;S hazards to workers.</li> <li>Provision of preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances.</li> <li>Provision of appropriate equipment to minimise risks, and requiring and enforcing its use.</li> <li>Training of workers, and provision of appropriate incentives for them to use and comply with H&amp;S procedures and protective equipment.</li> <li>Documentation and reporting of occupational accidents, diseases and incidents.</li> </ul> </li> </ul>

POTENTIAL IMPACT	MITIGATION AND MANAGEMENT MEASURES
	<ul style="list-style-type: none"> <li>- Emergency prevention, preparedness and response arrangements</li> </ul>
<b>Risks associated with COVID 19</b>	<ul style="list-style-type: none"> <li>• EPC Contractor will develop a COVID-19 Construction Risk Assessment at the start of the Project which will be reviewed regularly in line with the evolving national and WHO requirements/guidance.</li> <li>• A COVID-19 specific communication procedure for the workforce will be developed.</li> <li>• A 24hr emergency hotline will be provided.</li> <li>• Isolate/care for sick and potentially infected staff and workers.</li> <li>• Identification of any vulnerable groups (i.e., those with pre-existing conditions) working in the Project site (for the EPC and sub-contractors) and taking precautionary measures in accordance with the national and WHO guidelines.</li> <li>• Providing testing for staff as required at no cost to them.</li> <li>• Ensuring that social distancing measures are put in place i.e., allowing some of the office staff to work from home, working in shifts etc.</li> <li>• Promotion of personal hygiene among the workers and providing training, posters remind workers to wash their hands regularly, cleaning their work areas and equipment, proper sanitation etc.</li> <li>• Provide COVID-19 PPE to all workers</li> <li>• Worker accommodation shall be provided in a way that ensures social distancing, proper ventilation, hygiene etc.</li> <li>• The transportation of workers and access to the site shall be coordinated and regulated i.e., through reduced bus occupancy, temperature and PPE checks etc.</li> <li>• The EPC Contractor will provide a flexible working regime for those workers who may prefer to work from home due to health issues, childcare, home schooling etc without fear of victimisation.</li> <li>• Where workers are not able to travel back to their families due to travel restrictions, alternative ways of communication shall be made available to the workers such as free WIFI, access to international calling cards etc.</li> <li>• Mental health issues shall be addressed during induction and information provided on how to seek help from local experts.</li> <li>• There will be zero tolerance for discrimination against sick workers and reporting of illness and self-isolation will be encouraged.</li> <li>• There shall be a regular review and update of information/requirements in the ever-evolving situation including daily review of COVID-19 updates from WHO, national/regional public health authorities etc.</li> <li>• Where COVID-19 vaccines are available, the EPC Contractor will provide transportation for the workers (at no cost to them) to the vaccination centres or make arrangements in collaboration with health officials to have vaccinations performed at the Project site</li> </ul>
<b>Human Right Risk to Workers – Right to Work, Forced Labour, Right to Adequate Standard of Living, Non-Discrimination</b>	<ul style="list-style-type: none"> <li>• Local workers will be considered for available positions depending on skills &amp; qualifications.</li> <li>• The Project's process for employment will consider the availability of local talent.</li> </ul>

POTENTIAL IMPACT	MITIGATION AND MANAGEMENT MEASURES
	<ul style="list-style-type: none"> <li>The EPC contractor will not make employment decisions on the basis of personal characteristics, such as gender, race, nationality, ethnic origin, religion or belief, disability, age or sexual orientation, unrelated to inherent job requirements.</li> <li>The EPC contractor will not employ forced labour, which consists of any work or service not voluntarily performed that is exacted from an individual under threat of force or penalty. This covers any kind of involuntary or compulsory labour, such as indentured labour, bonded labour or similar labour-contracting arrangements.</li> <li>Workers will be provided with easily understandable contracts that include details of their benefits, deductions (if any and within the limits of the law) and obligations. In addition to the copy signed for the EPC records, the employees will also be provided with a copy for their records.</li> <li>Employees will be free to terminate their employment in accordance with the Uzbekistan Labour Code</li> <li>The EPC contractor will provide a plan detailing how working conditions and terms of employment are compliant with national labour, social security and occupational health and safety laws.</li> <li>Employees will be provided with suitable accommodation and worker accommodation areas will be managed in accordance with the EBRD and IFC Workers' Accommodation: Processes and Standards. The provision of good quality living accommodation, services and amenities will likely reduce the need for mixing with local communities.</li> <li>Employment relationship will be on the principle of equal opportunity and fair treatment and will not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment including provisions for maternity/paternity leave, accommodation, access to training, promotion, termination of employment or retirement, and discipline.</li> </ul> <p><i>Special measures of protection or assistance to promote local employment opportunities or selection for a particular job based on the inherent requirements of the job, which are in accordance with national law, will not be deemed discrimination.</i></p>
<b>Human Right Risk to Workers - Child Labour</b>	<ul style="list-style-type: none"> <li>The EPC contractor will comply with all relevant national laws, lenders requirements and ILO provisions related to the employment of minors.</li> <li>The EPC Contractor will devise a management procedure to ensure that all workers are above the minimum legal age of employment at the time of hiring. This will include the verification of official personal registration documents i.e., national ID, passport etc.</li> <li>The EPC will not employ children in a manner that is economically exploitative or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.</li> <li>Young people below the age of 18 years will not be employed in hazardous work and all work of persons under the age of 18 will be subject to an appropriate risk assessment.</li> <li>Where workers under the age of 18 are employed, the EPC Contractor shall establish a system to regularly monitor the working conditions and working hours of such young workers in line with Uzbek Labour Code.</li> </ul>

POTENTIAL IMPACT	MITIGATION AND MANAGEMENT MEASURES
<b>Human Right Risk to Workers - Wages, working hours, right to rest, benefits, and retrenchment</b>	<ul style="list-style-type: none"> <li>HR policies and procedures will be adapted appropriately to the size of the workforce required for the Project. Policies and procedures must be prepared to demonstrate consistency with the requirements of national legislation and IFC PS 2 and include a code of conduct on GBVH/SEA/SH.</li> <li>The EPC contractor will document and communicate to all workers their working conditions and terms of employment including their entitlement to wages, hours of work, overtime arrangements and overtime compensation, and any benefits (such as leave for illness, maternity/paternity, or holiday).</li> <li>Wages, benefits, leave days and other conditions of work offered should, overall, be comparable to those offered by equivalent employers in the relevant region of that country/region and sector concerned.</li> <li>The wages to all the workers (skilled and unskilled) will be enough to guarantee a living wage for all the workers (i.e., adequate food, clothing and housing).</li> <li>Workers will be provided equal remuneration for work of equal value.</li> <li>Workers will receive their pay on time and in full for ordinary and overtime hours, as well as paid leave.</li> <li>Wages will be paid regularly based on the agreed pay-day and adequate notice provided where exceptional circumstances necessitate change in the regular pay day.</li> <li>Where required, workers will be provided with the option of flexible work schedule in order to manage personal obligations while adequately fulfilling their employment duties.</li> <li>If the EPC contractor anticipates collective dismissals associated with the proposed project, the EPC contractor will develop a plan to mitigate the adverse impacts of retrenchment, in line with national law and good industry practice and based on the principles of non-discrimination and consultation. Without prejudice to more stringent provisions in national law, such consultation will involve reasonable notice of employment changes to the workers' representatives and, where appropriate, relevant public authorities so that the retrenchment plan may be examined jointly in order to mitigate adverse effects of job losses on the workers concerned. The outcome of the consultations will be reflected in the final retrenchment plan.</li> <li>Where workers have to be retrenched due to the economic impacts of COVID-19, this shall be carried out incrementally and consider options avoiding redundancy with retrenchment as the last option.</li> <li>The workers/representatives shall be involved on any labour reduction measures including those relating to COVID-19.</li> </ul>
<b>Human Right Risk to Workers - Workers Right to Health</b>	<ul style="list-style-type: none"> <li>During construction, workers will have access to medical professionals and suitable medical facilities, which will aim to prevent the spread of diseases internally. Site personnel will only be cleared for work after with a medical fitness certificate from an authorized medical centre;</li> <li>Any reportable disease will be diagnosed by the authorized occupation health centre doctor. Diagnosis includes identifying any new symptoms, or any significant worsening of existing symptoms;</li> <li>Any internal spreading diseases will be diagnosed and precautions will be taken as per the instructions from the national/ local medical authority;</li> </ul>

POTENTIAL IMPACT	MITIGATION AND MANAGEMENT MEASURES
	<ul style="list-style-type: none"> <li>The potential for exposure to water-borne, water-based, vector-borne diseases and communicable diseases as a result from project activities will be avoided or minimized;</li> <li>EPC Contractor will comply with Uzbek sick leave requirements.</li> <li>Due to the health risk posed by COVID-19, workers will be screened in accordance with the Uzbekistan guidelines and WHO. They will also be provided with PPE and training on how to ensure safety provided during induction and as part of the toolbox talks;</li> <li>If any cases of COVID-19 are reported on site, the EPC Contractor will notify the relevant health officials and isolation of concerned individuals performed immediately.</li> </ul>
<b>Human Right Risk to Workers – Collective Bargaining and Freedom of Association</b>	<ul style="list-style-type: none"> <li>HR Policies shall include the ability of workers to form or join all types of associations.</li> <li>HR Policies shall include the ability of workers to join a Trade Union; as well as ensure collective bargaining rights of workers.</li> <li>Trade unions must be permitted to function freely subject only to limitations that are in line with the Uzbekistan Labour Code and the International Human Right standards.</li> </ul>
<b>Human Right Risk to Workers – Freedom of Movement</b>	<ul style="list-style-type: none"> <li>Workers will be allowed to move freely and interact with local communities</li> <li>EPC Contractor to provide adequate cultural sensitization training during induction training to the workers, especially in terms of interaction with the local community members;</li> <li>EPC Contractor will adopt a zero-tolerance policy towards unacceptable workforce behaviour towards any community member.</li> <li>Workers will be provided adequate periods of leave to enable them travel to their home countries and spend time with their families.</li> </ul>
<b>Gender Risk - Gender Based Violence and Harassment</b>	<ul style="list-style-type: none"> <li>The workers will be provided with information regarding worker code of conduct in local languages as part of their employment contract which will include provisions for reporting, investigations, termination and disciplinary action against those who perpetrate gender violence and harassment.</li> <li>The EPC Contractor shall conduct mandatory regular training and awareness raising for the workforce about gender-based violence and harassment towards local community members and their colleagues especially women and the availability of a grievance mechanism to report any GBVH/SEA/SH cases.</li> <li>The workers shall be made aware of the laws and regulations that make sexual harassment and gender-based violence a punishable offence which is prosecuted.</li> <li>Ensure inclusion of a balanced representation of women on the HSE team who will be easily relatable and approachable to female workers.</li> <li>Project personnel in charge of receiving GBVH/SEA/SH grievances will be provided with appropriate training on how to handle such complaints. It is recommended that the personnel are trained in coordination with any GBVH organisations working in the Project area where available.</li> </ul>

POTENTIAL IMPACT	MITIGATION AND MANAGEMENT MEASURES
	<ul style="list-style-type: none"> <li>Female workers will be included in the grievance redress committee to help female workers and host community female members raise their grievances.</li> <li>Regular consultations should be undertaken with women on their concerns about the project</li> <li>The EPC Contractor will work to identify a suitable labour pool locally in order to minimize the need for bringing large number of workers from other regions or countries. This could also help the EPC Contractor in cutting cost associated with provision of accommodation facilities if the majority of the workers are sourced locally.</li> <li>Provision of opportunities for the workers to regularly return to their families who may be located far from the Project site.</li> <li>The EPC Contractor will provide opportunities for workers to have access to entertainment opportunities away from the host communities.</li> <li>EPC Contractor will allow submission and investigation of anonymous sexual harassment complaints by workers and host community members and protect the confidentiality of the complainants.</li> <li>The EPC Contractor will work in close coordination with the local authorities in investigating any complaints relating to gender violence and harassment in the host communities where it relates to Project workers.</li> <li>The EPC Contractor will provide targeted training (including in life skills such as leadership and decision-making) and awareness raising to vulnerable workers such as women.</li> <li>The EPC Contractor will prepare a Gender Equality and GBVH/SEA/SH Policy in line with Uzbek and lenders requirements. This will include provision of training to workers, subcontractors and suppliers on GBVH associated risks.</li> </ul>
<b>Gender Risk - GBVH/SEA/SH in Accommodation Facilities</b>	<ul style="list-style-type: none"> <li>The EPC shall provide safe, secure and separate accommodation facilities and sanitary facilities for the male and female workers (lockable sanitary facilities will be mandatory for women).</li> <li>The EPC Contractor will provide separate social facilities for the men and women.</li> <li>Worker accommodation areas will be managed in accordance with the EBRD and IFC Workers' Accommodation: Processes and Standards.</li> </ul>
<b>Gender Risk - Wage discrimination based on Gender</b>	<ul style="list-style-type: none"> <li>EPC Contractor to provide access to recruitment opportunities for women based on their qualifications.</li> <li>EPC Contractor will develop a Local Recruitment Plan that ensures equal opportunities are provided to women in the employment process, training and promotions</li> <li>The EPC Contractor shall implement an equal wage policy for women employees.</li> <li>Women will be provided equal remuneration as their male counterparts for work of equal value.</li> </ul>
<b>Gender Risk- Discrimination Based on Employment</b>	<ul style="list-style-type: none"> <li>The EPC Contractor will include the benefits and guarantees for both men and women in the HR policy with a clear commitment to non-discrimination during the recruitment process.</li> </ul>



POTENTIAL IMPACT	MITIGATION AND MANAGEMENT MEASURES
<b>Benefits &amp; Guarantees</b>	<ul style="list-style-type: none"> <li>EPC Contractor to improve employment opportunities by developing guidelines to ensure that discrimination against women on the basis of their marital or reproductive status is avoided.</li> <li>The EPC Contractor shall implement a zero-tolerance process for discrimination against women.</li> </ul>
<b>Gender Risk – Discrimination Based on Sexual Orientation</b>	<ul style="list-style-type: none"> <li>The EPC Contractor's HR policy will include a non-discrimination policy and a code of conduct.</li> <li>The EPC Contractor's HR policy will include GBVH policy applicable to all employees and sub-contractors.</li> <li>Sexual violence or harassment will not be tolerated and the EPC Contractor will include this in the worker's code of conduct which will be provided in the local languages.</li> <li>The grievance mechanism will be made available to all workers at no cost and without risk of retribution.</li> <li>The EPC Contractor will provide gender and inclusion orientation to its workforce in a culturally appropriate manner in order to eliminate the risk of harassment and violence.</li> </ul>
<b>Grievance Mechanism</b>	<ul style="list-style-type: none"> <li>The EPC contractor will provide a grievance mechanism for workers to raise reasonable workplace concerns. The client will inform the workers of the grievance mechanism at the time of hiring, and make it easily accessible to them. The mechanism should involve an appropriate level of management and address concerns promptly, using an understandable and transparent process that provides feedback to those concerned, without any retribution. The mechanism should not impede access to other judicial or administrative remedies that might be available under law or through existing arbitration procedures, or substitute for grievance mechanisms provided through collective agreements.</li> <li>Grievance mechanism will be used to monitor worker morale, understand how workers are affected and what their concern are in relation to COVID-19 and address pressing matters promptly.</li> <li>The grievance mechanism shall provide for confidential reporting and a support system for any workers reporting issues relating to GBVH/SEA/SH. The grievance mechanism will also allow for reporting through word of mouth for those who cannot write.</li> <li>Female workers will be included in the grievance redress committee to help female workers and host community female members raise their grievances.</li> </ul>
<b>Human Rights Policy</b>	<p>In addition to adhering to the national human rights requirements, the EPC Contractor will put in place a human right's policy in line with the UN Guiding Principles on Business and Human Rights. The statement policy will:</p> <ul style="list-style-type: none"> <li>Be approved at the most senior level of the company;</li> <li>Informed by relevant internal and external expertise;</li> <li>Stipulate the EPC's human rights expectations of personnel, local communities, sub-contractors and other suppliers directly linked to the construction of the project;</li> <li>Be publicly available and communicated internally and to the relevant stakeholders;</li> <li>Be reflected in the other policies and procedures to embed it throughout their construction phase activities.</li> </ul>

POTENTIAL IMPACT	MITIGATION AND MANAGEMENT MEASURES
<b>Risks Related to Supply Chain</b>	<ul style="list-style-type: none"> <li>ACWA Power &amp; the Project Company will develop a Supply Chain Management Plan and an E&amp;S Supplier &amp; Vendor Management Plan.</li> <li>ACWA Power &amp; the Project Company will ensure its core suppliers will implement the recommendations from the Supply Chain audit in relation to Envision's supply chain management system.</li> <li>ACWA Power &amp; the Project Company will establish a responsible sourcing policy to ensure traceability from wind turbine suppliers.</li> <li>ACWA Power and the Project Company will ensure that Envision and its core suppliers adopt self-covenants and codes to the loan agreement mandating the suppliers to map and complete risk assessment of the core WTG components.</li> <li>Envision must provide a Letter of Commitment to the Project Company which states that the suppliers involved in production/assembly of turbines will be locked contractually and any new or replacement supplier will go through a separate due diligence process to confirm no association with child and forced labour risks.</li> <li>A Corrective Action Plan (CAP) will be developed and implemented to address the gaps identified during the supply chain assessment and to address any non-compliances that that will be identified in future audits</li> <li>ACWA Power &amp; the Project Company will notify the lenders when labour risks such as forced/child labour or allegations are raised in relation to their core suppliers.</li> <li>ACWA Power and the Project Company will ensure that Envision and its core suppliers keep all records, rules and policies in relation to workers protection and the provision of safe working conditions.</li> <li>A dis-engagement clause will be added to the loan agreement in case of material non-compliance with the measures listed above.</li> </ul>

**Table 18-4 Labour and Working Conditions Mitigation and Management Measures – Operation**

TOPIC	MITIGATION AND MANAGEMENT MEASURES
<b>Occupational Health and Safety</b>	<ul style="list-style-type: none"> <li>Workers will be provided with a safe and healthy work environment, taking into account inherent risks and specific classes of hazards associated with the Project.</li> <li>The Project's Operator will implement and maintain an OHS management system specific to the operational phase taking into account specific risks associated with the project, legal requirements and duty of care.</li> <li>The Operator of the OHTL will ensure that adequate training with regards to electrocution, working at height and other risks is provided to O&amp;M personnel responsible for maintenance works along the transmission line</li> <li>The Project's Operator will ensure that adequately rated equipment such as hoisting/lifting equipment, tool bags and power tools are given to O&amp;M personnel.</li> <li>The Project's Operator will be responsible for ensuring that all affiliated sub-contractors comply with the OHS management system. The OHS management system will be in-line with recognised GIIP and as a minimum, this plan will include:</li> </ul>

TOPIC	MITIGATION AND MANAGEMENT MEASURES
	<ul style="list-style-type: none"> <li>- Means of identifying and minimising, so far as reasonably practicable, the causes of potential H&amp;S hazards to workers.</li> <li>- Provision of preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances.</li> <li>- Provision of appropriate equipment to minimise risks, and requiring and enforcing its use.</li> <li>- Training of workers, and provision of appropriate incentives for them to use and comply with H&amp;S procedures and protective equipment.</li> <li>- Documentation and reporting of occupational accidents, diseases and incidents.</li> <li>- Emergency prevention, preparedness and response measures</li> </ul>
<b>Risks Associated with COVID-19</b>	<ul style="list-style-type: none"> <li>• O&amp;M shall develop a COVID-19 Operational Risk Assessment at the start of the operational phase which will be reviewed regularly in line with the evolving national and WHO requirements/guidance.</li> <li>• Develop a COVID-19 specific communication procedure for the workforce.</li> <li>• Provide a 24hr emergency hotline.</li> <li>• Isolate/care for sick and potentially infected staff and workers.</li> <li>• Identification of any vulnerable groups (i.e. those with pre-existing conditions) working in the Project site and taking precautionary measures in accordance with the national and WHO guidelines.</li> <li>• Providing testing for staff at no extra cost to them.</li> <li>• Ensuring that social distancing measures are put in place i.e. allowing some of the office staff to work from home, working in shifts etc.</li> <li>• Promotion of personal hygiene among the workers and providing training, posters remind workers to wash their hands regularly, cleaning their work areas and equipment, proper sanitation etc.</li> <li>• Provide COVID-19 PPE to all workers</li> <li>• The transportation of workers and access to the site shall be coordinated and regulated i.e. through reduced bus occupancy, temperature and PPE checks etc.</li> <li>• O&amp;M will provide a flexible working regime for those workers who may prefer and are able to work from home due to health issues, child care, home schooling etc. without fear of victimisation.</li> <li>• Mental health issues shall be addressed during induction and information provided on how to seek help from local experts.</li> <li>• There shall be a regular review and update of information/requirements in the ever-evolving situation including daily review of COVID-19 updates from WHO, national/regional public health authorities etc.</li> </ul>
<b>Human Right Risk to Workers –Forced Labour, Right to Adequate Standard of Living, Non-Discrimination</b>	<ul style="list-style-type: none"> <li>• The O&amp;M Company will not employ forced labour, which consists of any work or service not voluntarily performed that is exacted from an individual under threat of force or penalty. This covers any kind of involuntary or compulsory labour, such as indentured labour, bonded labour or similar labour-contracting arrangements.</li> <li>• The O&amp;M Company will not make employment decisions on the basis of personal characteristics, such as gender, race, nationality, ethnic origin, religion or belief, disability, age or sexual orientation, unrelated to inherent job requirements.</li> </ul>

TOPIC	MITIGATION AND MANAGEMENT MEASURES
	<ul style="list-style-type: none"> <li>• Employment relationship will be on the principle of equal opportunity and fair treatment, and will not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment including provisions for maternity/paternity leave, accommodation, access to training, promotion, termination of employment or retirement, and discipline.</li> </ul> <p><i>Special measures of protection or assistance to promote local employment opportunities or selection for a particular job based on the inherent requirements of the job, which are in accordance with national law, will not be deemed discrimination.</i></p>
<b>Human Right Risk to Workers – Child Labour</b>	<ul style="list-style-type: none"> <li>• The O&amp;M Company will comply with all relevant national laws, lenders requirements and ILO provisions related to the employment of minors.</li> <li>• In any event, the Project will not employ children in a manner that is economically exploitative, or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.</li> <li>• Young people below the age of 18 years will not be employed in hazardous work and all work of persons under the age of 18 will be subject to an appropriate risk assessment.</li> </ul>
<b>Human Right Risk to Workers – Wages, working hours, right to rest, benefits, and retrenchment</b>	<ul style="list-style-type: none"> <li>• Wages, benefits, leave days and other conditions of work offered should, overall, be comparable to those offered by equivalent employers in the relevant region of that country/region and sector concerned. The wages to all the workers including to any unskilled workers will be enough to constitute for a living wage.</li> <li>• If the O&amp;M Company anticipates collective dismissals associated with the proposed project, the O&amp;M Company will develop a plan to mitigate the adverse impacts of retrenchment, in line with national law and good industry practice and based on the principles of non-discrimination and consultation. Without prejudice to more stringent provisions in national law, such consultation will involve reasonable notice of employment changes to the workers' representatives and, where appropriate, relevant public authorities so that the retrenchment plan may be examined jointly in order to mitigate adverse effects of job losses on the workers concerned. The outcome of the consultations will be reflected in the final retrenchment plan.</li> <li>• Where workers have to be retrenched due to the economic impacts of COVID-19, this shall be carried out incrementally and consider options avoiding redundancy with retrenchment as the last option.</li> <li>• The workers/representatives shall be involved on any labour reduction measures including those relating to COVID-19. The O&amp;M Company will document and communicate to all workers their working conditions and terms of employment including their entitlement to wages, hours of work, overtime arrangements and overtime compensation, and any benefits (such as leave for illness, maternity/paternity, or holiday).</li> </ul>
<b>Gender Risk-Discrimination Based on Employment Benefits &amp; Guarantees</b>	<ul style="list-style-type: none"> <li>• The Project Company will develop partnerships with local education providers to promote STEM careers for young women through a women-focused outreach initiative to publicise the new internship programme.</li> <li>• The Project Company will introduce a new and certified internship programme to equip at least 20 young women (i.e. at least 5 per</li> </ul>

TOPIC	MITIGATION AND MANAGEMENT MEASURES
	year) with higher skill levels, in collaboration with the local education partners.
<b>Gender Risk- Gender Based Violence and Harassment</b>	<ul style="list-style-type: none"> <li>• The workers will be provided with information regarding worker code of conduct in local languages as part of their employment contract which will include provisions for reporting GBVH (either in person or anonymously), investigation procedure, termination and disciplinary action against those who perpetrate gender violence and harassment.</li> <li>• The O&amp;M Company shall conduct mandatory regular training and awareness raising for the workforce about gender-based violence and harassment towards local community members and their colleagues especially women.</li> <li>• The workers shall be made aware of the laws and regulations that make sexual harassment and gender-based violence a punishable offence which is prosecuted.</li> <li>• Mandatory and regular training for workers on required lawful conduct in host communities and legal consequences for failure to comply including dismissal.</li> <li>• O&amp;M shall provide safe, secure and separate living spaces and sanitary facilities for the male and female workers (lockable sanitary facilities will be mandatory for women).</li> <li>• Provision of opportunities for the workers to regularly return to their families.</li> <li>• O&amp;M Company will allow submission and investigation of anonymous sexual harassment complaints by workers and host community members and protect the confidentiality of the complainants.</li> <li>• The O&amp;M Company will work in close coordination with the local authorities in investigating any complaints relating to gender violence and harassment in the host communities where it relates to Project workers.</li> <li>• O&amp;M will identify local based GBVH/SEA/SH organizations that can offer support to those who experience violence or harassment.</li> <li>• The O&amp;M's HR policy will include a non-discrimination policy and a code of conduct.</li> <li>• The O&amp;M's HR policy will include GBVH policy applicable to all employees and sub-contractors.</li> </ul>
<b>Grievance Mechanism</b>	<ul style="list-style-type: none"> <li>• The O&amp;M Company will provide a Grievance Mechanism for workers to raise reasonable workplace concerns including GBVH. The client will inform the workers of the grievance mechanism at the time of hiring and make it easily accessible to them. The mechanism should involve an appropriate level of management and address concerns promptly, using an understandable and transparent process that provides feedback to those concerned, without any retribution. The mechanism should not impede access to other judicial or administrative remedies that might be available under law or through existing arbitration procedures, or substitute for grievance mechanisms provided through collective agreements.</li> <li>• The Grievance Mechanism will be used to monitor worker morale, understand how workers are affected and what their concern are in relation to COVID-19 and address pressing matters promptly.</li> </ul>

TOPIC	MITIGATION AND MANAGEMENT MEASURES
<b>Human Rights Policy</b>	<p>In addition to adhering to the national human rights requirements, the O&amp;M Company will put in place a human right's policy in line with the UN Guiding Principles on Business and Human Rights. The statement policy will:</p> <ul style="list-style-type: none"> <li>• Be approved at the most senior level of the company;</li> <li>• Informed by relevant internal and external expertise;</li> <li>• Stipulate the O&amp;M's human rights expectations of personnel, local communities and other suppliers directly linked to the operational phase of the project;</li> <li>• Be publicly available and communicated internally and to the relevant stakeholders;</li> <li>• Be reflected in the other policies and procedures to embed it throughout the operational phase activities.</li> </ul>

## 18.4 Monitoring

Monitoring of Labour, Working Conditions and Human Rights will be undertaken as required via the management measures outlined above. For instance, monitoring of the worker accommodation will form part of the wider Environmental and Social Management System internal audits. The following table outlines key indicators.

**Table 18-5 Labour and Working Conditions Key Monitoring indicators**

MONITORING	PARAMETER	FREQUENCY & DURATIONS	MONITORING LOCATIONS
<b>Construction &amp; Operations</b>			
Worker Contracts & HR	Records of contracts, payments, receipt of benefits, leave entitlements, retrenchment etc.	On-going	For all Project workers (direct staff) and oversight of sub-contractor staff dedicated to the project
Women employed in the Project	Number of women employed in the project including their rank and remuneration compared to men occupying the same positions.	On-going	For all female Project personnel including those employed by the sub-contractors.
Worker Welfare	Sanitation Facilities, Office Spaces, Welfare and Rest Areas	On-going	At all such facilities on-site
Quality of Accommodation	Inspection/internal audit of worker accommodation facilities vs. IFC & EBRD standards	Monthly	All accommodation facilities provided to direct and full time sub-contracted labour.



MONITORING	PARAMETER	FREQUENCY & DURATIONS	MONITORING LOCATIONS
OH&S Near Misses (involving external parties)	Any classified near miss	On-going	n/a
OH&S Emergency and Incidents	Any classified emergency situation or incident	On-going	n/a
Grievances including those relating to gender-based violence and harassment, sexual exploitation & abuse and sexual harassment	Grievances received	On-going	Project site and any other grievances received from communities in reference to Project workforce including suppliers.
Health of the workers	Records of the illnesses the workers are suffering from and an analysis of top diseases.	On-going	Project site clinic or first aid facility
	COVID-19	Daily	All Project site workers including those under different sub-contractors, suppliers etc.
Human rights complaints/violations as reported by Project workers including workers hired through third-parties or in the supply chain	Grievances received	On-going	As defined in the Stakeholder Engagement Plan (SEP)

## 19 CLIMATE AFFAIRS

### 19.1 Applicable Requirements & Standards

#### 19.1.1 National Requirements

Uzbekistan submitted its Third National Communication to the UNFCCC and it ratified the Paris Agreement in November 2018 which brought its Intended Nationally Determined Contribution (INDC) into effect for the period up to 2030. The long-term objective of the INDC is to decrease specific emissions of greenhouse gases per unit of GDP by 10% by 2030 from level of 2010. This envisages the support from the international organisations and financial, ensuring access to advanced energy saving and environmentally sound technologies and resource allocation for climate financing.

The ratification of the Paris Climate Agreement committed Uzbekistan to transitioning to a green economy, and adoption of the following normative documents:

- Decree of the President of the Republic of Uzbekistan. № PD-4477, dated October 4, 2019 "On approval of the Strategy on transition of the Republic of Uzbekistan to the "green" economy for the period 2019-2030".
- Decree of the President of the Republic of Uzbekistan, № PD-5863, dated October 30, 2019, "On approval of the Concept of environmental protection of the Republic of Uzbekistan until 2030".

Priority areas of "The Strategy on transition of the Republic of Uzbekistan to the "green" economy for the period 2019-2030" regarding to the electricity producing industry are:

- Reconstruction and modernization of generating capacities of existing power plants with implementation of highly efficient technologies based on combined cycle gas and gas turbine units;
- Improvement of configurations and modernization of main power networks to increase the stability of the power system;
- Implementation of organizational and technical measures, including optimization of modes;
- Increasing the level of automatization of technological processes; and
- Full equipment of power consumption systems with automatic control and metering devices.

### 19.1.2 Lender Requirements

#### **EBRD**

According to EBRD Environmental and Social Policy, climate change shall be considered throughout the assessment process and identify appropriate climate resilience and adaptation measures to be integrated into the project design.

EBRD is committed to 'engage, whenever appropriate, in innovative investments and technical assistance to support no/low-carbon investments and climate change mitigation and adaptation opportunities, as well as identify opportunities to avoid, minimise or reduce greenhouse gas emissions in projects. EBRD requires its clients to assess risks caused by climate change to the projects. EBRD will also support its clients in developing climate adaptation measures and climate resilient investments as well as in managing risks caused by climate change'.

#### **EPFIs**

Equator Principles IV establishes that impacts to climate should be avoided where possible, and in support of the 2015 Paris Agreement recognises that EPFIs have a role to play in improving the availability of climate-related information.

Factors including climate change are required to be incorporated into the Project Review and Categorisation (EP1), while a key element of EP IV (under EP2 for Environmental and Social Assessment) is that an assessment of climate change risks is expected in an ESIA.

For projects that have Scope 1 & 2 GHG emissions of over 100,000 tonnes of CO<sub>2</sub> equivalent per annum, there are also other requirements linked to alternative analysis and client annual reporting on GHG emissions.

## 19.2 National Context

Uzbekistan is among the countries most vulnerable to climate change and has identified agriculture, economy, population health, energy, water resource management and disaster risk reduction as its most vulnerable sectors (WBG, 2021). Average annual air temperatures have risen steadily and significantly in Uzbekistan over the past century, albeit with no variation from year to year. From 1950 to 2013, temperatures rose at an average rate of 0.27°C per decade. Analysis in the total annual precipitation amount averaged by various regions of Uzbekistan for the period 1950-2013 show very low trends towards decreases.

Climate observations in Uzbekistan show that the number of days of high air temperature ( $>40^{\circ}\text{C}$ ) has increased from the 1950's to 2000s. The number of days with low temperature (below either  $-15^{\circ}\text{C}$  or  $-20^{\circ}\text{C}$ ) has decreased.

According to Third National Communication of the Republic of Uzbekistan under the UN Framework Convention on Climate Change (2016) the different regions of Uzbekistan face varying vulnerability to climate change. Karakalpakstan, where the Project is located, is classified as one of the three most vulnerable territories in Uzbekistan to climate change.

## 19.3 Climate Projections

Climate projection data is modelled data from the global climate model compilations of the Coupled Model Inter-comparison Projects (CMIPs), overseen by the World Climate Research Program. The following data is summarised from the World Bank Climate Change Knowledge Portal.

### TEMPERATURE

- Climate change is expected to produce increases in monthly maximum temperatures across Uzbekistan. The model ensemble's estimate of warming under the highest emission pathway (RCP 8.5) is an average temperature increase of  $2.4^{\circ}\text{C}$  by mid-century and nearly  $5^{\circ}\text{C}$  by end of the century.
- The number of hot days in Uzbekistan is projected to increase by 28.6 days by 2040 – 2059 days, under an RCP 8.5 scenario.
- The number of tropical nights (minimum temperature above  $20^{\circ}\text{C}$ ) is projected to increase by over 31 days by 2040 – 2059, under an RCP 8.5 scenario.

### PRECIPITATION

- Uzbekistan will experience a high variability of rainfall across different agroecological and climatic zones.
- Across the country, however, there have been some spatial differences in precipitation trends, with annual precipitation declining between 50-100mm in some central and eastern districts and moderately increasing in areas surrounding the Aral Sea.
- Increased heat and precipitation variability will lead to increased evapotranspiration in summer months resulting in a decrease in river flowing conditions.
- Future projections suggest that increased glacier melting (glaciers in Central Asia have shrunk by 25% and are expected to shrink by another 25% over the next 20 years) is expected to impact water availability and river flow in the short to long term in Uzbekistan.

## DROUGHTS

The risks of dry years and droughts is also anticipated to increase in Uzbekistan due to decreases in river runoff and increases in population growth. This will be especially prevalent in the downstream reaches of the rivers in the Amu-Darya River basin such as Karakalpakstan,

## 19.4 Potential Project Impacts on Climate Change

### 19.4.1 Construction Phase

#### 19.4.1.1 Fuel Combustion

At this stage, the expected quantity of fuel to be consumed during construction by the appointed EPC & subcontractors is unknown. This will depend on the type and number of mobile equipment and diesel generators used, the hours of machinery/equipment operation and the efficiency of equipment. Therefore, the assessment of construction impacts is based upon assumptions, using existing experience and understanding of the construction requirements of similar projects.

#### STATIONARY SOURCE

The primary stationary combustion fuel source that will be used during the construction of the Project will be temporary diesel generators. At the time of writing the number of generators and their estimated consumption are unknown. The following calculation has been based on an estimated 10,500 litres of diesel per month.

GHG emissions during construction were calculated using the Greenhouse Gas Protocol calculation tool for GHG Emissions from Stationary Combustion (World Resources Institute, 2015), and are summarised in the table below.

**Table 19-1 GHG Emissions from the Use of Diesel During Project Construction**

FUEL TYPE	VOLUME OF FUEL (LT)	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	ALL GHGs (TONNES CO <sub>2</sub> E)
Liquid fossil (Diesel)	10,500	28.103	1.138E-03	2.276E-04	28.195
<b>Total GHG emissions from fossil fuels (tonnes CO<sub>2</sub>e)</b>					<b>28.195</b>
*if/when the generators are operational					

#### MOBILE SOURCE

The construction of the Project will require an amount of mobile equipment, machinery and vehicles to facilitate works. Such equipment (such as excavators, rollers, cranes, pneumatic

compressors, and other vehicles) will be ample on the site, access road and OHTL route, and are expected to be used in most construction processes. It is anticipated that these will be fuelled by either diesel or unleaded petrol.

#### **LOSS OF CARBON SINKS**

The Project is located in an open area with desert shrubs as the major vegetative cover and the site lacks the voluminous biomass that would present stores for carbon. While it is noted that the construction phase will result in the removal of ground cover vegetation, this is not expected to be widespread as it will be primarily limited to WTG & OHTL tower footprints and the access road. As such, significant loss of carbon storage is not anticipated due to the Project's development.

#### **19.4.2 Operational Phase**

The Project will contribute 1.25% to Uzbekistan's overall renewable energy goals, power 120,000 Uzbek households and offset 200,000 tonnes of carbon emissions per year<sup>3</sup>.

There will be negligible negative impacts such as grid electricity usage during periods of low generation and mobile source emissions from operation and maintenance vehicles, however, these are considered to be insignificant.

### **19.5 Vulnerability of the Project to Climate Change**

A climate physical risk refers to those risks that arise as a result of climate change and can be either acute or chronic. Acute risks refer to event-driven changes in climate patterns e.g., increased severity of extreme weather events. Chronic risks refer to longer-term shifts in climate patterns e.g., sustained higher temperatures, that may lead to sea level risk or chronic heat waves (Equator Principles, 2020).

According to the World Bank Climate Change Knowledge Portal (2021), impacts from climate change make Uzbekistan increasingly vulnerable to: droughts, high temperatures, heat waves, heavy precipitation, mudflows, floods, and avalanches.

The key vulnerabilities for Karakalpakstan and the Project are that:

- Summer months are expected to have high temperatures, prolonged heat waves, and expanded summer season. Heat waves, and increased frequency

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<sup>3</sup> <https://www.acwapower.com/news/acwa-power-breaks-ground-on-uzbekistans-first-publicly-tendered-wind-project/>



of the consecutive number of days above 39°C are expected to occur throughout the country. There is the potential for maintenance workers to work outdoors, however, this is expected to be limited and impacts to the Project from increased temperatures are assessed to be negligible.

- Droughts may become more frequent due to river runoff decrease, particularly for areas with increased demand and consumption from economic development and population growth. This is especially relevant due to the Project's location to the Amu Darya. Water is not a primary resource for the operation of the Project and potable water is able to be transported to the Project site and this is deemed to be a negligible impact.
- There is the potential for higher frequency heavy rainfall, which may result in increased runoff/flooding, however, as per the UzAssystem (2022) hydrology study there is not expected to be a significant change in precipitation as a result of climate change. The flood modelling has modelled 1 in 50- and 100-year storms and recommended mitigation strategies.

### 19.5.1 Climate Transition Risks

Climate transition risks refer to those which may arise from the plans or processes that may be put in place to adjust to a lower-carbon, climate-resilient economy. These can include changes or updates to policy or legislation (e.g., introduction of emission limits), imposition of carbon tax, shifts in demand and supply due to technology and market changes and reputation risks reflecting changing customer or community perceptions (Equator Principles, 2020).

As part of the Uzbekistan 2030 Energy Strategy, the country aims to develop and expand the use of renewables and integrate it into the unified power system. The Project is a renewable energy project therefore it is not expected to result in emission of any greenhouse gases during operations.

## 20 CUMULATIVE IMPACT ASSESSMENT

As stated in Section 2.4.1, the GOU is contemplating development of a 200 MW wind project in the Karatau mountain range adjacent to the site. The specific area reserved for the potential 200 MW wind project is located east of the site.

In addition, areas adjacent to the Project are allocated for future mining exploitation with the mineral rights currently owned by the State. However, Juru Energy (2021) state *"following discussions with the State Committee on Industrial Safety of the Republic of Uzbekistan, dated 12/05/2020 it is understood that the mining areas are not actively earmarked for exploitation at this time."*

At the time of writing, no further information has been provided with regards to future wind or mining projects and therefore at this time it is not possible to conduct a cumulative impact assessment. However, based on an understanding of the Project it is possible to conduct a high-level discussion of potential cumulative impacts on VECs. The majority of potential impacts can be ruled out due to the fact that the Project would already be constructed and therefore cumulative construction impacts (such as air, noise and waste impacts) can be ruled out. Due to the limited operational waste impacts cumulative waste impacts are also not anticipated.

Although impacts to terrestrial ecology and avifauna as a result of the Project have been shown to be relatively minor, it is considered likely that ecology will be a VEC that will need to be considered when a CIA is conducted for any future developments in the area. The CIA will need to take into account the CRM from this Project, alongside the other ecology impacts as listed in this ESIA.

In addition, cumulative socioeconomic impacts are a possibility. Although the Project has a relatively small construction workforce and an even smaller operational workforce, the cumulative influx of further workforce for other projects will need to be assessed.

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