HyNet North West

ENVIRONMENTAL STATEMENT (VOLUME III)

Appendix 6.1 Construction Dust Assessment

HyNet Carbon Dioxide Pipeline DCO

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulations 5(2)(a)

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1. CONSTRUCTION DUST ASSESSMENT METHODOLOGY

1.1.1. The following section sets out the methodology for a construction dust assessment, taken directly from the IAQM Guidance (**Ref. 1**)

1.2. STEP 1 – Screening the Need for a Detailed Assessment

1.2.1. An assessment of construction dust is required where there are:

- 'Human receptors' within 350m of the site boundary; or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s); and/or
- 'Ecological receptors' within 50m of the site boundary; or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

1.2.2. Where the need for a construction dust assessment is screened out, it can be concluded that the level of risk is "negligible".

1.3. Step 2A – Define the Potential Dust Emission Magnitude

1.3.1. The following are examples of how the potential dust emission magnitude for different activities can be defined. (Note that not all the criteria need to be met for a particular class). Other criteria may be used if justified in the assessment.

Table 1 – Definitions of Dust Emission Magnitudes

Dust Emission Magnitude	Activity
Large	Demolition >50,000m^3 building demolished, dusty material (e.g. concrete), on-site crushing/screening, demolition >20m above ground level
	Earthworks >10,000m^2 site area, dusty soil type (e.g. clay), >10 earth moving vehicles active simultaneously, >8m high bunds formed, >100,000 tonnes material moved
	Construction >100,000m^3 building volume, on site concrete batching, sandblasting
	Trackout

	>50 HDVs out / day, dusty surface material (e.g. clay), >100m unpaved roads
Medium	Demolition 20,000 - 50,000m^3 building demolished, dusty material (e.g. concrete), 10-20m above ground level
	Earthworks 2,500 - 10,000m^2 site area, moderately dusty soil (e.g. silt), 5-10 earth moving vehicles active simultaneously, 4m - 8m high bunds, 20,000 -100,000 tonnes material moved
	Construction 25,000 - 100,000m^3 building volume, dusty material e.g. concrete, on site concrete batching
	Trackout 10 - 50 HDVs out / day, moderately dusty surface material (e.g. clay), 50 -100m unpaved roads
Small	Demolition <20,000m^3 building demolished, non-dusty material (e.g metal cladding), <10m above ground level, work during wetter months
	Earthworks <2,500m^2 site area, soil with large grain size (e.g. sand), <5 earth moving vehicles active simultaneously, <4m high bunds, <20,000 tonnes material moved, earthworks during wetter months
	Construction <25,000m^3, non-dusty material (e.g. metal cladding or timber)
	Trackout <10 HDVs out / day, non-dusty soil, < 50m unpaved roads

1.4. Step 2B - Define the Sensitivity of the Area

1.4.1. The tables below present the IAQM assessment methodology to determine the sensitivity of the area to dust soiling, human health and ecological impacts respectively. The IAQM guidance provides guidance to allow the sensitivity of individual receptors to dust soiling and health effects to assist in the assessment of the overall sensitivity of the study area.

Table 2 – Sensitivity of the Area to Dust Soiling Effects

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 3 – Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration ($\mu g/m^3$)	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} Concentration ($\mu g/m^3$)	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
	28-32	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table 4 – Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Sources (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

1.5. Step 2C – Define the Risk Of Impacts

1.5.1. The dust emissions magnitude determined at Step 2A should be combined with the sensitivity of the area determined at Step 2B to determine the risk of impacts without mitigation applied. For those cases where the risk category is 'negligible' no mitigation measures beyond those required by legislation will be required.

Table 5 – Risk of Dust Impacts

Sensitivity of surrounding area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
Earthworks and Construction			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

1.6. Step 3 – Site Specific Mitigation

1.6.1. Having determined the risk categories for each of the four activities it is possible to determine the site-specific measures to be adopted. These measures will be related to whether the site is considered to be a low, medium or high risk site. The IAQM guidance (**Ref. 1**) details the mitigation measures required for high, medium and low risk sites as determined in Step 2C.

1.7. Step 4 – Determine Significant Effects

1.7.1. Once the risk of dust impacts has been determined in Step 2C and the appropriate dust mitigation measures identified in Step 3, the final step is to determine whether there are significant effects arising from the construction stage. For almost all construction activities, the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effect will normally be negligible.

2. ACTIVITY SPECIFIC CONSTRUCTION DUST ASSESSMENTS

2.1. OPEN-TRENCH PIPELINE CONSTRUCTION

ASSESSMENT OF POTENTIAL DUST EMISSION MAGNITUDE

Demolition

2.1.1. No dust generating demolition activities will occur during the trench digging stage of the DCO Proposed Development. Therefore, consideration of the impact of this source on dust soiling and ambient PM_{10} is not required.

Earthworks

2.1.2. With an effective construction working area (per work-front) of less than 2,500m^2 within potential impact range of individual receptors i.e. 350m either side of the receptor along the trench, trench digging involves moving less than 20,000 tonnes of material on one work-front and there are predicted to be fewer than 10 earth moving vehicles active at any one time. Therefore, the dust emission magnitude for earthworks is **Small**.

Construction

2.1.3. For trench digging there is likely to be less than 25,000m^3 of material constructed on one work front. Sections of the pipeline will be prefabricated and welded together before being placed in the ground. The dust emission magnitude for construction is **Small**.

Trackout

2.1.4. The exact number of outward vehicle movements relating to trench digging is for the purpose of this assessment assumed to be fewer than 10 HDVs per day but typically over unpaved ground for 50 to 100m. Therefore, the dust emission magnitude for trackout is **Medium**.

2.1.5. **Table 6** provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 6 – Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	N/A
Earthworks	Small
Construction Activities	Small
Trackout	Medium

ASSESSMENT OF THE SENSITIVITY OF THE STUDY AREA

2.1.6. Under low wind speed conditions, it is likely that the majority of dust would be deposited in the area immediately surrounding the source. In the worst-case location for the works (near Mancot Lane) there are 12 residential receptors within 20m of the construction dust source.

2.1.7. Background annual mean PM_{10} concentrations in the vicinity of the DCO Proposed Development were mapped by Defra as no higher than 14µg/m^3 in 2020.

2.1.8. The open-trench excavation could also occur within or in close proximity to the Deeside and Buckley Newt Sites Special Area of Conservation (SAC), a European designated site which could be sensitive to emissions of dust and PM_{10}.

2.1.9. For trackout, there are multiple residential receptors within 20m of trackout routes from construction compounds. There are multiple Local Wildlife Sites within 20m of trackout routes across the DCO Proposed Development.

2.1.10. Taking the above into account and following the IAQM assessment methodology, the sensitivity of the area to changes in dust and PM_{10} has been derived for each of the construction activities with the outcomes presented in **Table 7**.

Table 7 – Sensitivity of the Study Area

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	High	High	High
Human Health	N/A	Low	Low	Low
Ecological	N/A	High	High	Medium

RISK OF IMPACTS

2.1.11. The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction stage, prior to mitigation. The risk category identified for each construction activity has been used to determine the level of mitigation required.

Table 8 – Summary Dust Risk Table to Define Site Specific Mitigation

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Low Risk	Low Risk	Medium Risk
Human Health	N/A	Negligible	Negligible	Low Risk
Ecological	N/A	Low Risk	Low Risk	Low Risk

2.2. TRENCHLESS CROSSINGS

ASSESSMENT OF POTENTIAL DUST EMISSION MAGNITUDE

Demolition

2.2.1. No dust generating demolition activities will occur during the trenchless crossing phase of the Proposed Development. Therefore, consideration of the impact of this source on dust soiling and ambient PM_{10} is not required.

Earthworks

2.2.2. With a working area of less than 2,500m^2 trenchless crossings are likely to move between 20,000 tonnes and 100,000 tonnes of material and there are predicted to be fewer than 10 earth moving vehicles active at any one time. Therefore, the dust emission magnitude for earthworks is **Medium**.

Construction

2.2.3. For trenchless crossings there is likely to be less than 25,000m^3 of material on one work front. Sections of the pipeline will be prefabricated. The dust emission magnitude for construction is **Small**.

Trackout

2.2.4. The exact number of outward vehicle movements relating to trenchless crossings is unknown, but it is likely to be fewer than 10 HDVs per day but typically over unpaved ground for 50 to 100m. Therefore, the dust emission magnitude for trackout is **Medium**.

2.2.5. **Table 9** provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 9 – Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	N/A
Earthworks	Medium
Construction Activities	Small
Trackout	Medium

ASSESSMENT OF THE SENSITIVITY OF THE STUDY AREA

2.2.6. Under low wind speed conditions, it is likely that the majority of dust would be deposited in the area immediately surrounding the source. The worst-case location is Chester Road where there are 29 residential receptors within 50m of the proposed trenchless crossing works and 5 within 20m.

2.2.7. The trenchless crossing works could also occur within 50m the Deeside and Buckley Newt Sites SAC, which could be sensitive to emissions particulate matter.

2.2.8. Background annual mean PM_{10} concentrations in the vicinity of the DCO Proposed Development were mapped by Defra as no higher than 14µg/m^3 in 2020.

2.2.9. For trackout, there are multiple residential receptors within 20m of trackout routes from construction compounds. There are multiple Local Wildlife Sites within 20m of trackout routes across the DCO Proposed Development.

2.2.10. Taking the above into account and following the IAQM assessment methodology, the sensitivity of the area to changes in dust and PM_{10} has been derived for each of the construction activities with the outcomes presented in **Table 10**.

Table 10 – Sensitivity of the Study Area

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Medium	Medium	High
Human Health	N/A	Low	Low	Low
Ecological	N/A	Medium	Medium	Medium

RISK OF IMPACTS

2.2.11. The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation. The risk category identified for each construction activity has been used to determine the level of mitigation required.

Table 11 – Summary Dust Risk Table to Define Site Specific Mitigation

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Medium Risk	Low Risk	Medium Risk
Human Health	N/A	Low Risk	Negligible	Low Risk
Ecological	N/A	Medium Risk	Low Risk	Low Risk

2.3. ABOVE GROUND INSTALLATION (AGI) CONSTRUCTION

ASSESSMENT OF POTENTIAL DUST EMISSION MAGNITUDE

Demolition

2.3.1. No demolition activities will occur during this stage of the DCO Proposed Development. Therefore, consideration of the impact of this source on dust soiling and ambient PM_{10} is not required.

Earthworks

2.3.2. With a site area of between 2,500m^2 and 10,000m^2 AGI construction will move between 20,000 tonnes and 100,000 tonnes of material and there are predicted to be fewer than 10 earth moving vehicles active at any one time. Therefore, the dust emission magnitude for earthworks is **Medium**.

Construction

2.3.3. AGI Construction will typically involve less than 25,000m^3 of building material and will be a mixture of metal and crushed aggregate. Therefore, the dust emission magnitude for construction is **Small**.

Trackout

2.3.4. The exact number of outward vehicle movements relating to AGI construction is unknown, but it is likely to be fewer than 10 HDVs per day but over unpaved ground for 50 to 100m. As a reasonable worst-case, the dust emission magnitude for trackout is **Medium**.

2.3.5. **Table 12** provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 12 – Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	N/A
Earthworks	Medium
Construction Activities	Small
Trackout	Medium

ASSESSMENT OF THE SENSITIVITY OF THE STUDY AREA

2.3.6. Under low wind speed conditions, it is likely that the majority of dust would be deposited in the area immediately surrounding the source. The AGI construction is planned for mostly rural areas, and in the worst-case location of Northop Hall there are 3 high sensitivity receptors within 200m of the works, and 5 medium sensitivity receptors within 50m of the trackout routes around Stanlow AGI.

2.3.7. Background annual mean PM_{10} concentrations in the vicinity of the DCO Proposed Development were mapped by Defra as no higher than 14µg/m^3 in 2020.

2.3.8. Taking the above into account and following the IAQM assessment methodology, the sensitivity of the area to changes in dust and PM_{10} has been derived for each of the construction activities with the outcomes presented in **Table 13**.

Table 13 – Sensitivity of the Study Area

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Low	Low	Low
Human Health	N/A	Low	Low	Low
Ecological	N/A	Low	Low	Low

RISK OF IMPACTS

2.3.9. The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction stage, prior to mitigation. The risk category identified for each construction activity has been used to determine the level of mitigation required.

Table 14 – Summary Dust Risk Table to Define Site Specific Mitigation

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Low Risk	Negligible	Low Risk
Human Health	N/A	Low Risk	Negligible	Low Risk
Ecological	N/A	Low Risk	Negligible	Low Risk

2.4. BLOCK VALVE STATION (BVS) CONSTRUCTION

ASSESSMENT OF POTENTIAL DUST EMISSION MAGNITUDE

Demolition

2.4.1. No demolition activities will occur during this stage of the Proposed Development. Therefore, consideration of the impact of this source on dust soiling and ambient PM_{10} is not required.

Earthworks

2.4.2. With a site area of less than 2,500m^2 BVS construction will move less than 20,000 tonnes of material and there are predicted to be fewer than 10 earth moving vehicles active at any one time. Therefore, the dust emission magnitude for earthworks is **Small**.

Construction

2.4.3. BVS construction will typically involve less than 25,000m^3 of building material and will be mostly metal and crushed aggregate. Therefore, the dust emission magnitude for construction is **Small**.

Trackout

2.4.4. The exact number of outward vehicle movements relating to BVS construction is unknown, but it is likely to be fewer than 10 HDVs per day but over unpaved ground for 50 to 100m. As a worst-case, the dust emission magnitude for trackout is **Medium**.

2.4.5. **Table 15** provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 15 – Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	N/A
Earthworks	Small
Construction Activities	Small
Trackout	Medium

ASSESSMENT OF THE SENSITIVITY OF THE STUDY AREA

2.4.6. Under low wind speed conditions, it is likely that the majority of dust would be deposited in the area immediately surrounding the source. The BVS construction is planned for mostly rural areas, and in the worst-case location of Aston Hill there are 19 high sensitivity receptors within 100m of the works, and 4 high sensitivity receptors within 20m of the trackout routes.

2.4.7. Cornist Lane BVS is located within 20m of the nearby Local Wildlife Site.

2.4.8. Background annual mean PM_{10} concentrations in the vicinity of the DCO Proposed Development were mapped by Defra as no higher than 14µg/m^3 in 2020.

2.4.9. Taking the above into account and following the IAQM assessment methodology, the sensitivity of the area to changes in dust and PM_{10} has been derived for each of the construction activities with the outcomes presented in **Table 16**.

Table 16 – Sensitivity of the Study Area

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Low	Low	Medium

Human Health	N/A	Low	Low	Low
Ecological	N/A	Low	Low	Low

RISK OF IMPACTS

2.4.10. The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction stage, prior to mitigation. The risk category identified for each construction activity has been used to determine the level of mitigation required.

Table 17 – Summary Dust Risk Table to Define Site Specific Mitigation

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Negligible	Negligible	Low Risk
Human Health	N/A	Negligible	Negligible	Low Risk
Ecological	N/A	Negligible	Negligible	Low Risk

3. SCREENING OF CONSTRUCTION TRAFFIC FLOWS

3.1.1. The greatest impact on air quality due to emissions from vehicles and plant associated with the construction stage will be in the areas immediately adjacent to the temporary construction access points. The locations of construction access routes are spread across the DCO Proposed Development and will have an impact on multiple A roads across the network. Further details of these construction traffic routes are provided in **Chapter 11 – Traffic and Transport (Volume II)**.

3.1.2. The IAQM Planning Guidance (**Ref. 2**) includes screening criteria for traffic data which, if met, require an air quality assessment. The criteria used to screen construction traffic data relating to the DCO Proposed Development are:

- A change of LDV (Light Duty Vehicle) flows of more than 500 AADT (Annual Average Daily Traffic)
- A change of HDV flows of more than 100 AADT

3.1.3. These thresholds apply to roads outside of an Air Quality Management Area (AQMA). One AQMA exists within the Study Area (Thornton le Moors AQMA No. 4), but it is declared for concentrations of SO_2 from industry and, therefore, not relevant to changes in emissions from road sources.

3.1.4. Current forecasted construction traffic flows indicate that there will be less than 200 LGVs and 50 HGVs on the road network, as an annual average daily flow. The highest flows will occur on the A494 near its junction with the A55. These flows are well below the IAQM screening threshold, and it is unlikely that construction traffic will cause a significant air quality effect.

4. REFERENCES

- **Ref. 1** – Institute of Air Quality Management (2016) Guidance on the Assessment of Dust and Demolition from Construction
- **Ref. 2** – Environmental Protection UK and Institute of Air Quality Management (2017) Land Use Planning and Development Control: Planning for Air Quality