CO₂Sense Ltd and Leeds City Council and Kirklees Council

West Yorkshire Adaptation Action Plan

Task 1: Review of West Yorkshire Adaptation Action Plan

REP/CW001

Issue | April 2011

www.arup.com

Document Verification



Job title		West Yorks	Job number								
			215954-00								
Document	title	Task 1: Rev Plan	File reference								
Document	ref	REP/CW001									
Revision Date		Filename									
Draft 1	24/03/11	Description	WYAAP Review_Task 1_draft.docx First draft								
			Prepared by	Checked by	Approved by						
		Name	Craig White	Alice Owen	Alice Owen						
		Signature									
Issue	08/04/11	Filename	WYAAP Review	v_Task 1_FINAL_ISSU	JE_060411.docx						
		Description	Included prioritis	aptation measures							
			Prepared by	Checked by	Approved by						
		Name	Craig White	Andy Sheppard	Andrew McDowell						
		Signature									
		Filename									
		Description									
			Prepared by	Checked by	Approved by						
		Name									
		Signature									
		Filename		1	1						
		Description									
			Prepared by	Checked by	Approved by						
		Name									
		Signature									
	ı		Issue Document Verification with Doc								

Contents

			Page			
1	Intro	duction	1			
2	Review of the WYAAP					
	2.1	Aims of WYAAP	2			
	2.2	Observations	2			
	2.3	Recommendations for Improvement	3			
	2.4	Adaptation Measures Mapping	5			

1 Introduction

Arup have been commissioned by CO₂Sense, Leeds City Council and Kirkless Council to review and further development the existing West Yorkshire Adaptation Action Plan (WYAAP).

The specific tasks of the commission are;

Task 1: Review the current WYAAP to critically appraise the work against other leading local authority/sub-regional action plans to identify and develop any gaps or improvement;

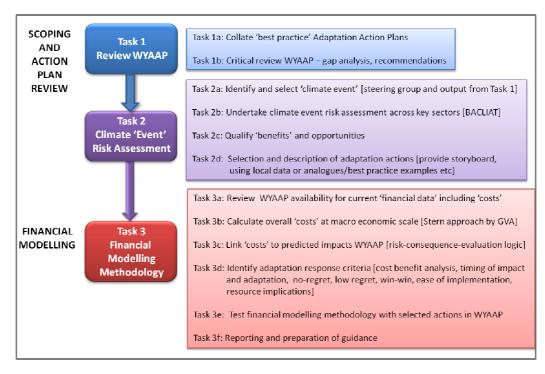
Task 2: Review the WYAAP to understand how a single climate event can impact on a range of services through identifying the multiple risks and benefits



across the six key sectors of transport, built environment, natural environment, utilities, waste management and health and social care. This will also highlight how one adaptation action can sometimes address a number of the identified risks and impacts.

Task 3: Develop a financial modelling methodology and use this to address gaps in current information in the WYAAP. The model should provide answers to the overall cost of an impact, how long before a chosen action will take effect and the cost effectiveness of that action and note any current practices that hinder future action.

Figure 1 illustrates the methodology that has been applied to this commission.



This short report represents the deliverable of Task 1 Review of the WYAAP.

2 Review of the WYAAP

This paper contains a short review of the WYAAP. The review has not considered each individual component or adaptation action suggested within the WYAAP. Instead the review has focussed on the approach, the process taken, to identify the strengths, gaps and contains recommendations for future activity as the WYAAP evolves. The review concludes with a restructuring of the WYAAP to capture cross sectoral climate risks and a mapping of the existing adaptation actions to the Adaptation Sub-Committee priority areas.

2.1 Aims of WYAAP

The West Yorkshire Adaptation Action Plan was produced as one of the outputs from the NI188 Adapting to Climate Change process. The WYAAP was intended to support the five local authorities in the sub-region to achieve level 3 of NI188. Essentially, NI188 level 3 required the local authority to have developed a detailed adaptation action plan, the WYAAP fulfilled this obligation. The outputs from the Local Climate Impact Profile (LCLIP) for West Yorkshire were used to identify current vulnerability to severe weather events. To assess future vulnerability to climate change, a climate change risk assessment template was developed which utilised the UKCP09 climate projections. Six priority sectors were selected for the risk assessment; natural environment, built environment, transport, utilities, waste management and health and social care. Each sector was risk assessed against the UKCP09 projection; climate impacts and consequences were identified and a risk level assigned based on a scoring matrix of severity and likelihood. A series of adaptation 'actions' were then developed for the consequences.

2.2 Observations

The NI188 risk assessment methodology employed for the WYAAP is a process based approach to identifying key risks and potential consequences. The methodology has resulted in a broad service area climate risk assessment using UKCP09 projections. A commonality of approach has been achieved. The LCLIP has clearly been fed into the risk assessment to enable the existing vulnerability of key service areas to be identified. The risk assessment was physically undertaken by the relevant service area officers, enabling a practitioner professional opinion on each service and creating 'ownership' of the process and results. Consequently awareness of climate risks within the local authorities has increased, building adaptive capacity in key service areas. The review of activity within the Local Strategic Partnership (LSP) has similarly begun a broader stakeholder climate risks engagement process. While different levels of understanding of climate risks are evident across the service areas, it is also clear that some service areas have demonstrated an excellent and insightful awareness of the issues and the risk assessment process e.g. transport.

2.3 Recommendations for Improvement

The WYAAP was produced for a specific reason and at a given point in time. Since its development and publication there has been a significant change in adaptation reporting and also new additional guidance and intelligence has become available. The abolition of the NI188 reporting process and the publication of the Adaptation Sub-Committee adaptation priorities¹, the emergence of the outputs from the national Climate Change Risk Assessment (CCRA) are all relevant to the future evolution and implementation of the WYAAP. In addition Task 1 requires a critical independent review of the WYAAP to identify any gaps and areas for improvement.



Recommendations for improvement with justifications are given below;

• Focus adaptation activity onto the Adaptation Sub-Committee (ASC) priority areas of land use planning, infrastructure, buildings, emergency planning and natural resources;

Justification: The ASC have identified these areas as priority for the UK, this is a result of an assessment of current adaptation activity (preparedness) and need to address these areas as they have potentially long asset lives, irreversible impacts and require early action to be effective. Alignment with national priority areas may potentially enable more rapid deployment of adaptation measures e.g. funding, support sources.

• Adopt and apply an outcomes based approach for the monitoring of identified climate risks and effectiveness of adaptation measures.

Justification: Will assist with refining existing vulnerability and whether adaptation measures are achieving their goal. The WYAAP could develop a adaptation performance monitoring framework using the indicator set under development by the ASC².

• Extend the climate risk assessment to cover additional service areas and other critical sectors.

Justification: Current gaps identified in the WYAAP include archaeology and cultural heritage and private business and third sectors. A risk assessment across these and other service areas and sectors will help identify where adaptation measures are critically important e.g. vulnerable residents, strategic business locations.

-

¹ How well prepared is the UK for climate change? ASC Sept 2010

² Common Metrics for Adaptation, Metroeconomica, AEA, Paul Watkiss Associates, July 2009

• Refine and prioritise adaptation measures, develop adaptation action plan.

Justification: There is currently duplication of adaptation measures across service areas and potential to merge measures to achieve efficiencies and synergistic outcomes e.g. green infrastructure strategy. Some adaptation measures are inappropriate to the climate risk e.g. Code for Sustainable Homes and overheating risk and these need rechecking. The lengthy list of adaptation measures could also be prioritised based on efficiency and efficacy across service areas, this will help focus delivery in a timely and cost-effective manner perhaps with partner organisations. Criteria for classifying adaptation measures could include; no-regret measures, cost, effectiveness, ease of implementation etc.

Realign all sector consequences and adaptation measures to primary climate risks.

Justification: Climate risks have a multitude of consequences to many receptors and service areas. By realigning the consequences to the climate risk it is possible to see where adaptation measures should be implemented for maximum benefit e.g. cross-sectoral benefit. Managing the compound consequences should achieve multiple outcomes.

• Refine and standardise the WYAAP terminology to that used in the CCRA.

Justification: As the CCRA and the pending National Adaptation Plan emerge it may be appropriate for the WYAAP to align itself to established climate change terminology. This will assist with communications between local authorities, stakeholders and government particularly as the climate lexicon matures.

• Develop a communications plan and business/resident engagement strategy.

Justification: The engagement of businesses and residents and other sectors is fundamentally critical to build adaptive capacity and improve climate resilience. Communications of the WYAAP including climate risks and adaptation activity in an appropriate format will be required.

• Periodically update the climate risk assessment with emerging risk and vulnerability data.

Justification: Climate impact science and evidence is continually evolving. The WYAAP needs to capture additional data as it emerges through a periodic review process. This will ensure the risks and vulnerability assessments are updated as new data/evidence becomes available and therefore enable the development of appropriate adaptation measures.

2.4 Adaptation Measures Mapping

During progress meetings it was requested that Arup undertake the following tasks on the existing adaptation measures;

- Realign all sector consequences and adaptation measures to primary climate risks.
- Focus adaptation activity onto the ASC priority areas of land use planning, infrastructure, buildings, emergency planning and natural resources;
- Identify which adaptation measures within the WYAAP are the responsibility of national government, sub-regional and local government/partnerships, and
- Undertake a quick prioritisation process of the current WYAAP adaptation
 measures, high priority (i.e. low regret options), medium priority (good
 effectiveness, low cost, ease of implementation) and low priority (limited
 effectiveness, high cost and difficult to implement). It should be
 recognised that this prioritisation process should be undertaken after the
 completion of the earlier recommendation of a thorough review of the
 effectiveness of the adaptation measures.

This mapping exercise and prioritisation assessment is contained in the attached spreadsheet.

						WYAAP	ector Action and Delivery Scale				ASC Priorities			Indicative Priority
Impact	Receptor		Support for the Moors for the		al Built Environment National Sub-Regional Loca	I Transport National Sub-Regional	Local Utilities National Sub-Regional Local	al Waste Management National Sub-Regional Loca	Health and Social Care National Sub-Regional Local	Land Use Planning	National Infrastructure Buildings I	Natural Resources	Emergency Planning	
			Future partnership and other upland partnerships	х										н
			Delivery of Landscape scale South Pennines project Delivery of the Blanket Bog	х										M
	Upland Bog		Habitat Action Plan Increased public awareness re	х	_									Н
		Reduced water shortage capacity		x x	_									н
		leading to downstream flash flooding and decreased water	Delivery of the Blanket Bog	х										М
		Reduced water shortage capacity		х	+									н
	River Corridors and		rivers, riverine corridors and associated habitat projects Leeds City Region green	х										М
	aquatic habitats		infrastructure strategy Introduction of the Water	х										н
			Framework Directive X Awareness of specific weather											Н
	Woodlands and Forest		alerts Increased public awareness re	x x	_									н
Drought		Increased water management	fire risks Leeds City Region green	x x	+									н
	Agricultural land		infrastructure strategy Landscape scale biodiversity projects	x										м
	Domestic Buildings		projects		Increased use of ponds, roadside swales x									н
					Install grey water systems and water harvesting x									M
		Stress of water supply			system Leeds City Region green Infractructure strategy X									н
	building				infrastructure strategy Increase the use of rainwater harvesting and x									M
					storage Water efficient fixtures and									
		Subsidence of road/rail lines			fittings installed x	Identify vulnerable locations,								М
	Road network and	causing surface and structural damage, resulting in increased maintenance or repair and				use of appropriate raft foundations resilient to soil heave	x							н
		disruption to travel					Dulldamananah							
		Increased demand for water and declining water stocks					Build new reservoirs X Invest in water efficiency in							L
		Reduced water availability (impact on people, gardens,					homes and businesses x							н
		agriculture)					Develop/plant drought resistant species X							L
		Decreased species number	Delivery of the Blanket Bog Habitat Action Plan	x				_						н
	Upland bog		Support for the Moors for the Future partnership and other upland partnerships	x										н
		Reduced comfort in buildings for occupants	apiana partnersnips		Promotion of Passivhaus developments									М
					Ensure new builds are built									н
	Domestic buildings				to highest possible Code for Sustainable Homes level Change orientation of									н
					building to ensure reduction in solar gain									L
					Local Development Framework adoption									н
		Rail lines buckling causing speed restrictions, disruption or closure				Plant trees and shrubs along vulnerable exposed lengths	x							н
	Rail infrastructure	of rail line and potential damage to infrastructure				of track to provide shading Adjust pre-tensioning of rail								
		Passenger discomfort and				line	x							н
		potential reduction in uptake of public transport				Ensure shaded and seated waiting facilities are available at exposed locations	х							L
						Real time bus information								
						systems to avoid people having to wait in the heat for	х							н
						an unnecessarily long time Design adequate natural ventilation systems without								
		Overheating in bus/rail stations causing heat stress				resorting to use of air conditioning	x							M
						Provide water during periods of heatwave	х							Н
		Poor thermal comfort within mass transit systems/public transport				Include specifications for adequate ventilation and/or air conditioning, tinted	x							н
	safety					windows etc in tender specifications								
		Increased risk of photochemical pollution episodes and poor air				Raise priority of air quality issues in local decision making and implement								
		quality				schemes to reduce levels of air pollution	х							н
Heatwave						Implement text alert scheme for people with respiratory	x							н
ricuttuare						illness during pollution episodes								
						Use real time information for public transport to avoid								
						vulnerable passengers having to wait at the roadside/rail	х							L
						stations during pollution episodes								
		Surge in energy demand for A/C					Cultural change to wear fewer clothes in summer and							L
		leads to brownouts					not to expect cold offices Provide air-conditioned							L
							public shelters X New buildings built to remain cooler in summer X							н
							Older buildings retrofitted with solar shades etc X							М
	Nuclear power stations	Emergency shutdown to avoid overheating leading to					n/a for Yorkshire but may need to deal with							N/A
		Disconnected premises					consequences		Analyse risk in existing stock and retrofit measures to reduce summer x					M
	Care staff								overheating X					- 141

													Indicative
Impact	Receptor	Consequence	Natural Environment National Sub-Regional Local	Built Environment National Sub-Regional Local	WYAAP Sector A Transport National Sub-Regional Local	Action and Delivery Scale Utilities National Sub-Regional Loca	Waste Management National Sub-Regional Loc	al Health and Social Care	National Sub-Pe	egional Local	Land Use Planning National In	ASC Priorities Infrastructure Buildings Natural Resource	Priority
Impact	несериог	consequence	Hational Sub-negional Local	LOCAL CONTROLLED INGLOSION SUD-REGIONAL LOCAL	Trational Sup-regional Local	regional Loca	Transperse Transperse Tool	Ensure new build is able to cope with	X Sub-Re	Local	Tradicial Ir		tes Emergency Planning Rating
		Overheating of domestic						higher temperatures Investigate and promote measures					
		properties						to reduce summer overheating	,	x x			M
								Ensure new build is able to cope with					+
	Vulnerable people							enhanced temperatures	х				н
	Vulnerable people (elderly, mental health patients,							Create a GIS enabled register of vulnerable people who may need					н
	drug users etc)							extra visits in event of heatwave and a plan for delivery		×			"
								Consider respiratory conditions					
		Harton and a constant the						within current Heatwave Plan	,	x x			н
		Heatwave and poor air quality Overheating of care premises						Ensure new build is able to cope with					н
								higher temperatures Retrofit measures into existing care	x				
	Care facilities and							facilities to reduce overheating when					н
	buildings							carrying out planned maintenance		^			"
								Increase green infrastructure to					
								reduce temperatures (LCR Green Infrastructure Strategy)	,	x x			н
	River Corridors and	Flooded infrastructure,	Development of the Surface					initiasitaceare strategy/					
	aquatic habitats	residential and business areas	Water Management Plans x x										Н
	Urban green spaces		Identify common examples										
	(includes parks and		and manage public areas appropriately X										М
	open spaces)				_								
		Buildings on low-lying areas at risk of flooding		Leeds City Region Eco- Settlement scheme X									М
				Homeowners complete a personal flood plan X									н
				personal flood plan	-								
				New policy on floods as part of the Local Development X									н
	Domestic Buildings			Framework									
				Creation of surface water x									н
				management plans									
				Install larger soakaways, french drains around									
				buildings to take the water									M
	<u> </u>	Increased damage to buildings		away Install flood resilient	-								_
				measures and retro existing									М
	Commercial buildings			buildings Carry out routine	-								_
				inspections and manage known 'pinchpoints'									н
		Existing flood defences can't			-								+
		cope		Amended parts L, F and G on Building Regulations will									
	Building Planning and Design			cover energy efficiency,									
	und Design			water use and ventilation Greater promotion of the	-								
				BREEAM standards X									М
		Increased risk of highway											
		flooding resulting from new developments or improvements			Provision of appropriate sustainable urban drainage, X								н
		causing transport disruption and			allowing temporary storage								
		flooding of frontage property Highway flooding causing traffic			and controlled release Use of VMA/CCTV/UTC								
		disruption, potential closure of			Intranet Service to direct								M
		highways [localised pluvial flooding]			traffic away from affected areas.								
		,g,			Emergency planning								
	Road network				procedures to help co- ordinate flood response								Н
					Develop bespoke actions to reduce vulnerability to flash								
					and overland flooding								, t
		Blocked highway gulleys and			Identify vulnerability of								M
		culverts			gully/culvert to flooding								
					Fortnightly cleansing of vulnerable culvert grids,								
					improved gully cleansing procedures								
		Serious flooding of highway											
		network and rail lines [fluvial]			Identify vulnerable locations and design appropriate flood								
					alleviation measures and								н
					supporting emergency procedures								
		Increased risk of landslips during heavy rainfall and saturated			Identify vulnerable locations and stabilise embankments								
		ground			using appropriate geo-								м
	rail infrastructure				technical solutions or tree planting								
		Structural damage to bridges			planting Increased frequency of								
		caused by increased river scour and debris blockage			bridge scour inspections from annual to 6 monthly								M
					Debris clearance following								М
					flood events X New design standards to								_
					improve bridge resilience to high river flows								М
		Localised flooding scouring and			Improve drainage, use of								
		erosion of ballast			SUDS and re-direct source of overland flooding								М
	Rail infrastructure												
					Contingency plans to enable efficient pumping of water X								м
					from affected sites								
	Reservoirs	Washout of sewage to watercourses				tbc in consultation with Yorkshire Water X							N/A
		Innudation of sub-stations				Risk assessments for specific							н
	Electricity grid	leading to blackouts and direct inudation of data centres				data centres X Flood resilience measures	-						
	,, 6.10					implemented or data centres X							м
		Staff unable to get to work				relocated							+
Floods							Conduct staff travel surveys						м
	Refuse workers						to assess vulnerability Ensure facilities are						
							accessible by multiple transport modes						н
		Localised flash flooding, sites					Identify sites at risk						
		have operations disrupted or suffer closure					x						н
		Sites have operations disrupted					Design appropriate						
	Road infrastructure	or suffer closure for a prolonged period					contingency measures for these sites						н
	•	-		I .									

							MIVAAD Cook	v Action and Delivery Scale						20	C Priorities		Indicative
	mpact	Receptor	Consequence	Natural Environment National Sub-Regional Loc	al Built Environment National Sub-Regional	ocal Transport		r Action and Delivery Scale al Utilities N	ational Sub-Regional Loc	tal Waste Management National Sub-Regional Lo	al Health and Social Care Nationa	I Sub-Regional	Local Land Use Plannin			tural Resources Emergency Plan	Priority ning Rating
			Serious fluvial flooding causing waste collections missed over a							Ensure that new facilities are built in areas with low							н
			prolonged period							flooding risk							
		Waste processing	Operations disrupted or site closes							Allow sufficient capacity at other sites to enable							м
		sites								continued waste management operations							
		Care staff	If roads flood more difficult to attend emergencies								Invest in boats/helicopters in order to be able to avoid floods	x					L
											Flood protection measures provided		х				М
			Increased severe flooding of residential areas								Create a GIS enabled register of						
		(elderly, mental									vulnerable people who may need priority rescuing/services in event of		x				M
		health patients, drug users etc)									a flood and a plan for delivery						
			Closer of health/social care								Flood protection measures provided		х				M
			facilities								Identify utilities at risk from flooding Install flood resilience measures to at	х	х				н
											risk sites		х				М
		Care facilities and buildings									Identify properties at risk of flooding	х	х				н
											Retrofit measures to at risk buildings to reduce likelihood of flooding		x				L
											Ensure new care facilities are not at risk of flooding		x				М
			Displacement, social isolation and mental health issues following										х				M
			residential flooding								Flood protection measures provided						
											Intensive social and healthcare support for affected communities	x	x				н
		Health service	Increased risk of chemical								after flooding event Ensure that chemical stores are						
			pollution								properly bunded and are not at risk from flooding		x				н
											Regular water quality monitoring following flood events		x				L
			Increased damage to buildings		Amended parts L, F and G						- Company						
		Building Planning			on Building Regulations will X cover energy efficiency,												М
		and Design			water use and ventilation												
			Buffeting/toppling of vehicles		BREEAM standards	х											M
			causing disruption			Consider use of natural shelter belts or wind		:									н
						diffusers in vulnerable areas											
						Appropriate use of highway warnings (VMS), improved											
						enforcement of speed restrictions and vehicle bans	x										M
		Road network	Trees, frontage or street			when dangerous Select robust highway trees											
			furniture blown onto road network disupting traffic			in exposed locations and ensure careful pruning of	x x										н
						trees in vulnerable areas Consider new design											
Increa	sed					standards for resilience of street furniture and building	x										м
Storm	illess					fabric A severe weather plan for											
			Trees etc blown onto rail			high winds Regular maintenance checks	:										н
			network disrupting rail transport and passenger safety			of structure stability and condition of trees, pruning of		1									M
						vulnerable trees											
		Rail infrastructure	Rail power lines affected by high winds/lightning strikes			Regular maintenance checks Design guidance for	:										M
						overhead lines/gantries may need to be amended to											
						account for potential future changes	x										н
			Risk of increasing gales/cross winds at LBIA			Innapropriate to shelter, must wait for winds to											
		Air infrastructure	WIIIUS dt LDIM			subside, wind direction to change or divert to											N/A
			Risk to pedestrians, cyclists being			appropriate airport Identify vulnerable											
			blown onto carriageway resulting in increased risk of accidents and			crossings/stretches of highway and erect guard rails	s										M
		Public comfort and	casualties			etc where necessary		•									
		safety				Consider use of wind diffusers or natural											
						shelterbelts in exposed locations											н
Increa	sed summer		Enhanced evaporation decreasing river levels leading to					Tbc in consultation with Yorkshire Water and									
	rature	Reservoirs	poor water quality and slower reservoir recharge					Environment Agency	×								N/A
			Higher incidence of vermin causing more demand on pest							Inform residents how to store waste so that it							н
			services Higher incidence of vermin							doesn't attract vermin Make staff aware of							
		Putrescible waste	causing greater risk of pest borne diseases to staff and residents							potential symptoms of vermin borne diseases and							н
										actions to take Ensure waste is stored in							
										ways less likely to encourage vermin							н
		Care facilities and	Higher temperatures encourage pests and associated diseases in								Rigorous and well monitored hygiene standards in health care						
		buildings	hospital and care environments								facilities		x				н
			More alien ailments e.g. West Nile virus								Border control to prevent spread of ailments and monitoring of X						
		Disease vectors									outbreaks Research into alien ailments and						
											awareness raising with health x professionals						1
	sed winter ratures		More incidence of disease								Monitoring of disease vector levels X	х					L
		Disease vectors									More active pest control when outbreaks occur	x	х				М
											- attoricano occul			1			