

# Speaker Slides

# Joe Clancy

*Biophilic Environments : Bridging The Divide*



landscape

27

march





# Biophilic Environments

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## Bridging The Divide







# What is Biophilia?

*...the innate emotional affiliation of human beings with other living organisms.*







# Biophilic Design

*Simply an extension of  
good design.....*

*...Hence, all good  
design is biophilic*







# Benefits of Biophilic Environments

*"There is now compelling evidence to show that contact with nature and the outdoors improves physical health and mental wellbeing".*

*-Alan Law, Chief  
Strategy & Reform  
Officer, Natural England  
(February 2015)*







# Nature-Health Relationships

- Physiological
- Psychological
- Cognitive







# 14 PATTERNS

		* *	STRESS REDUCTION	COGNITIVE PERFORMANCE	EMOTION, MOOD & PREFERENCE
NATURE IN THE SPACE	Visual Connection with Nature	* * *	<b>Lowered blood pressure and heart rate</b> (Brown, Barton & Gladwell, 2013; van den Berg, Hartig, & Staats, 2007; Tsunetsugu & Miyazaki, 2005)	<b>Improved mental engagement/ attentiveness</b> (Biederman & Vessel, 2006)	<b>Positively impacted attitude and overall happiness</b> (Barton & Pretty, 2010)
	Non-Visual Connection with Nature	* *	<b>Reduced systolic blood pressure and stress hormones</b> (Park, Tsunetsugu, Kasetani et al., 2009; Hartig, Evans, Jamner et al., 2003; Orsega-Smith, Mowen, Payne et al., 2004; Ulrich, Simons, Losito et al., 1991)	<b>Positively impacted on cognitive performance</b> (Mehta, Zhu & Cheema, 2012; Ljungberg, Neely, & Lundström, 2004)	<b>Perceived improvements in mental health and tranquility</b> (Li, Kobayashi, Inagaki et al., 2012; Jahncke, et al., 2011; Tsunetsugu, Park, & Miyazaki, 2010; Kim, Ren, & Fielding, 2007; Stigsdotter & Grahn, 2003)
	Non-Rhythmic Sensory Stimuli	* *	<b>Positively impacted on heart rate, systolic blood pressure and sympathetic nervous system activity</b> (Li, 2009; Park et al, 2008; Kahn et al., 2008; Beauchamp, et al., 2003; Ulrich et al., 1991)	<b>Observed and quantified behavioral measures of attention and exploration</b> (Windhager et al., 2011)	
	Thermal & Airflow Variability	* *	<b>Positively impacted comfort, well-being and productivity</b> (Heerwagen, 2006; Tham & Willem, 2005; Wigö, 2005)	<b>Positively impacted concentration</b> (Hartig et al., 2003; Hartig et al., 1991; R. Kaplan & Kaplan, 1989)	<b>Improved perception of temporal and spatial pleasure (alliesthesia)</b> (Parkinson, de Dear & Candido, 2012; Zhang, Arens, Huizenga & Han, 2010; Arens, Zhang & Huizenga, 2006; Zhang, 2003; de Dear & Brager, 2002; Heschong, 1979)
	Presence of Water	* *	<b>Reduced stress, increased feelings of tranquility, lower heart rate and blood pressure</b> (Alvarsson, Wiens, & Nilsson, 2010; Pheasant, Fisher, Watts et al., 2010; Biederman & Vessel, 2006)	<b>Improved concentration and memory restoration</b> (Alvarsson et al., 2010; Biederman & Vessel, 2006) <b>Enhanced perception and psychological responsiveness</b> (Alvarsson et al., 2010; Hunter et al., 2010)	<b>Observed preferences and positive emotional responses</b> (Windhager, 2011; Barton & Pretty, 2010; White, Smith, Humphryes et al., 2010; Karmanov & Hamel, 2008; Biederman & Vessel, 2006; Heerwagen & Orians, 1993; Ruso & Atzwanger, 2003; Ulrich, 1983)
	Dynamic & Diffuse Light	* *	<b>Positively impacted circadian system functioning</b> (Figueiro, Brons, Plitnick et al., 2011; Beckett & Roden, 2009) <b>Increased visual comfort</b> (Elyezadi, 2012; Kim & Kim, 2007)		



	Connection with Natural Systems				<b>Enhanced positive health responses; Shifted perception of environment</b> (Kellert et al., 2008)
NATURAL ANALOGUES	Biomorphic Forms & Patterns	*			<b>Observed view preference</b> (Vessel, 2012; Joye, 2007)
	Material Connection with Nature			<b>Decreased diastolic blood pressure</b> (Tsunetsugu, Miyazaki & Sato, 2007) <b>Improved creative performance</b> (Lichtenfeld et al., 2012)	<b>Improved comfort</b> (Tsunetsugu, Miyazaki & Sato 2007)
	Complexity & Order	* *	<b>Positively impacted perceptual and physiological stress responses</b> (Salingaros, 2012; Joye, 2007; Taylor, 2006; S. Kaplan, 1988)		<b>Observed view preference</b> (Salingaros, 2012; Hägerhäll, Laike, Taylor et al., 2008; Hägerhäll, Purcella, & Taylor, 2004; Taylor, 2006)
NATURE OF THE SPACE	Prospect	* * *	<b>Reduced stress</b> (Grahn & Stigsdotter, 2010)	<b>Reduced boredom, irritation, fatigue</b> (Clearwater & Coss, 1991)	<b>Improved comfort and perceived safety</b> (Herzog & Bryce, 2007; Wang & Taylor, 2006; Petherick, 2000)
	Refuge	* * *		<b>Improved concentration, attention and perception of safety</b> (Grahn & Stigsdotter, 2010; Wang & Taylor, 2006; Wang & Taylor, 2006; Petherick, 2000; Ulrich et al., 1993)	
	Mystery	* *			<b>Induced strong pleasure response</b> (Biederman, 2011; Salimpoor, Benovoy, Larcher et al., 2011; Ikemi, 2005; Blood & Zatorre, 2001)
	Risk/Peril	*			<b>Resulted in strong dopamine or pleasure responses</b> (Kohno et al., 2013; Wang & Tsien, 2011; Zald et al., 2008)





# Why Do We Need Biophilic Environments?

**“We will never be truly healthy, satisfied, or fulfilled if we live apart and alienated from the environment from which we evolved.”**

**-Stephen Kellert**







# Bridging the Divide







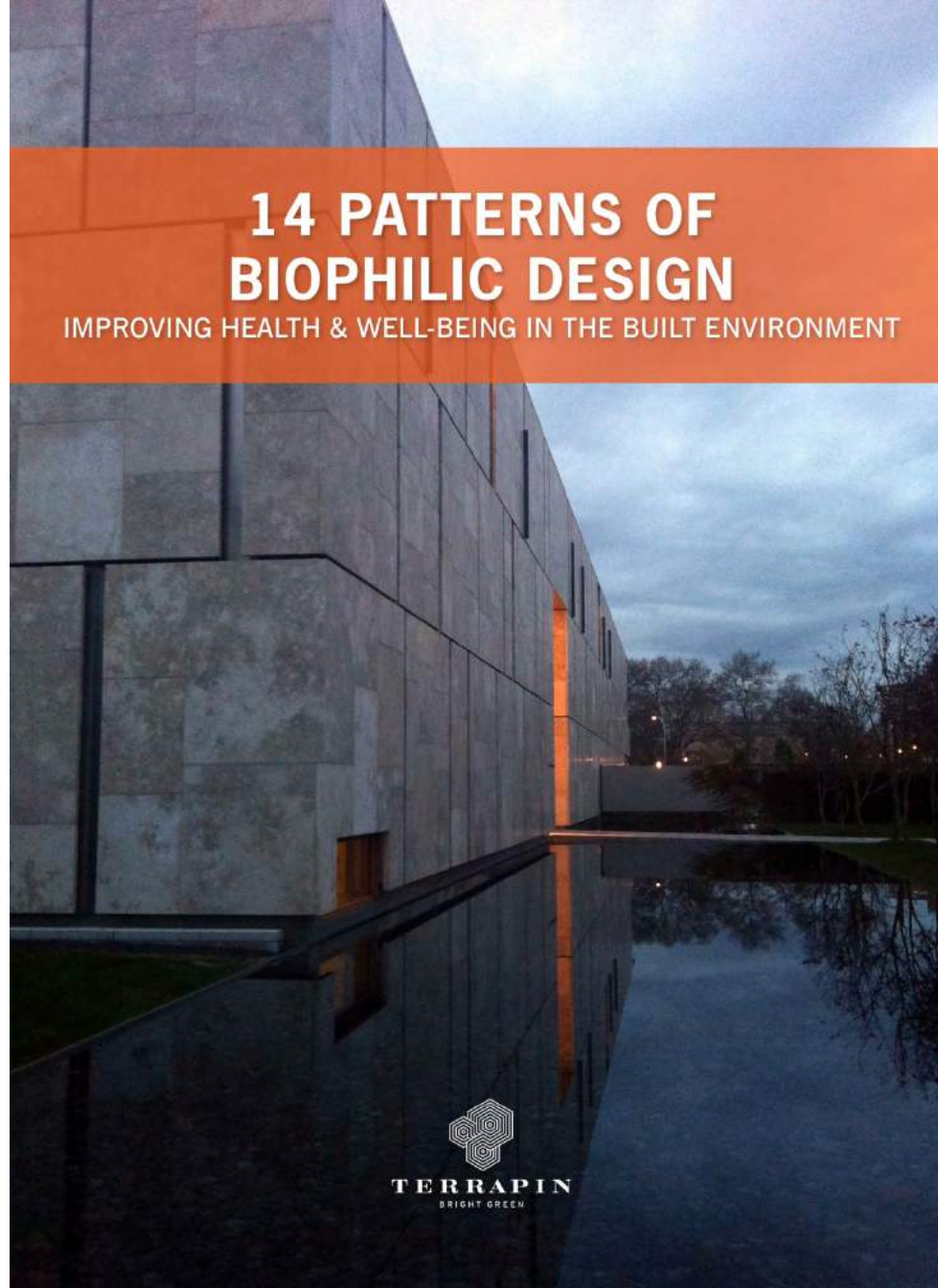
# Question







# 14 Patterns of Biophilic Design



## 14 PATTERNS OF BIOPHILIC DESIGN

FOR HEALTH AND WELL-BEING IN THE BUILT ENVIRONMENT



### NATURE IN THE SPACE

1. Visual Connection with Nature
2. Non-Visual Connection with Nature
3. Non-Rhythmic Sensory Stimuli
4. Access to Thermal & Airflow Variability
5. Presence of Water
6. Dynamic & Diffuse Light
7. Connection with Natural Systems



### NATURAL ANALOGUES

8. Biomorphic Forms & Patterns
9. Material Connection with Nature
10. Complexity & Order

### NATURE OF THE SPACE

11. Prospect
12. Refuge
13. Mystery
14. Risk/Peril

PHOTOGRAPHS BY MICHAEL MARRAS, JAMES P. MARRAS, AND TERRAPIN BRIGHT GREEN







# Nature in the Space







# Visual Connection to Nature







## Non-Visual Connection to Nature







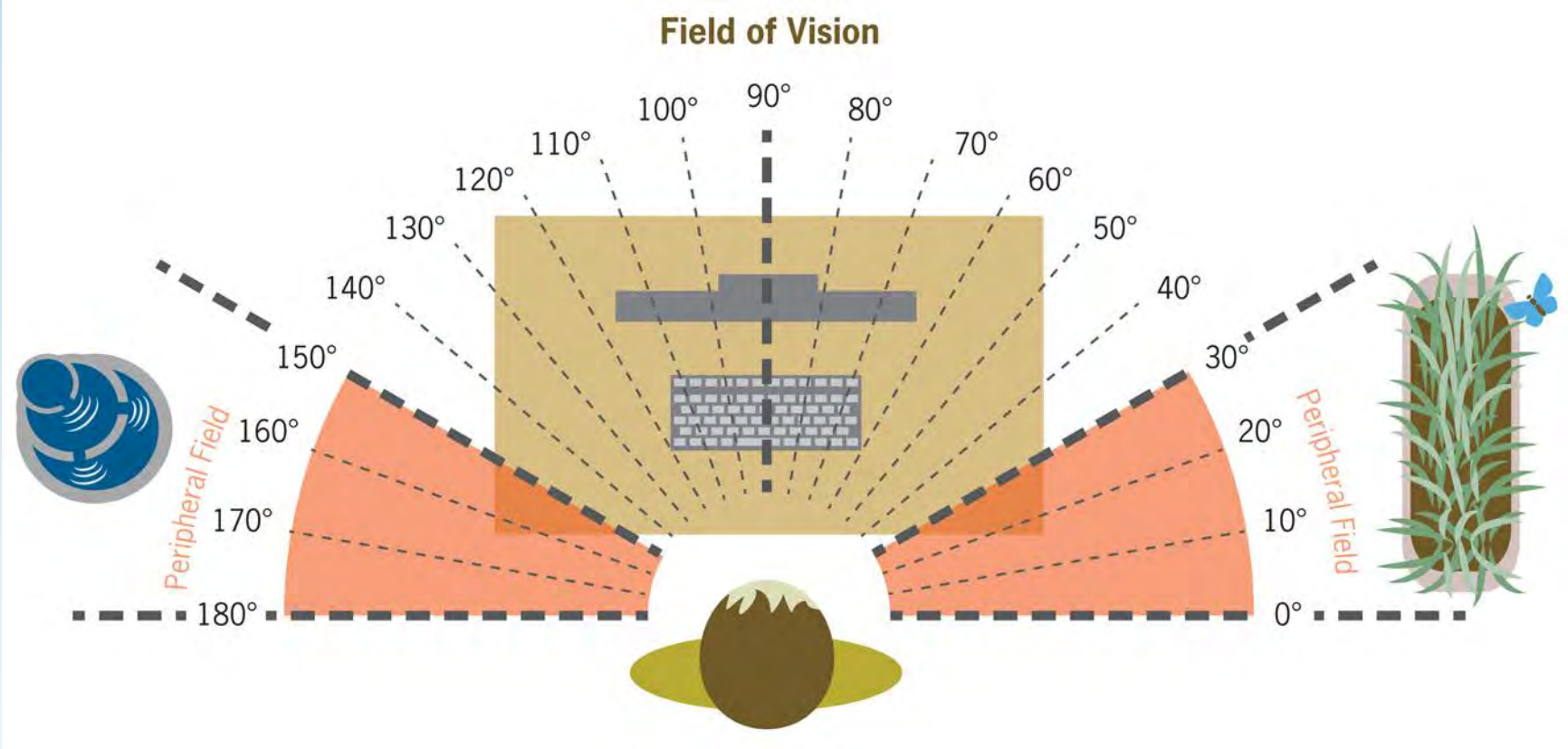
# Non-Rhythmic Sensory Stimuli







# Non-Rhythmic Sensory Stimuli







# Thermal & Airflow Variability







## Presence of Water







# Dynamic & Diffuse Daylighting



Botanics  
SHOP





# Connection with Natural Systems







# Question







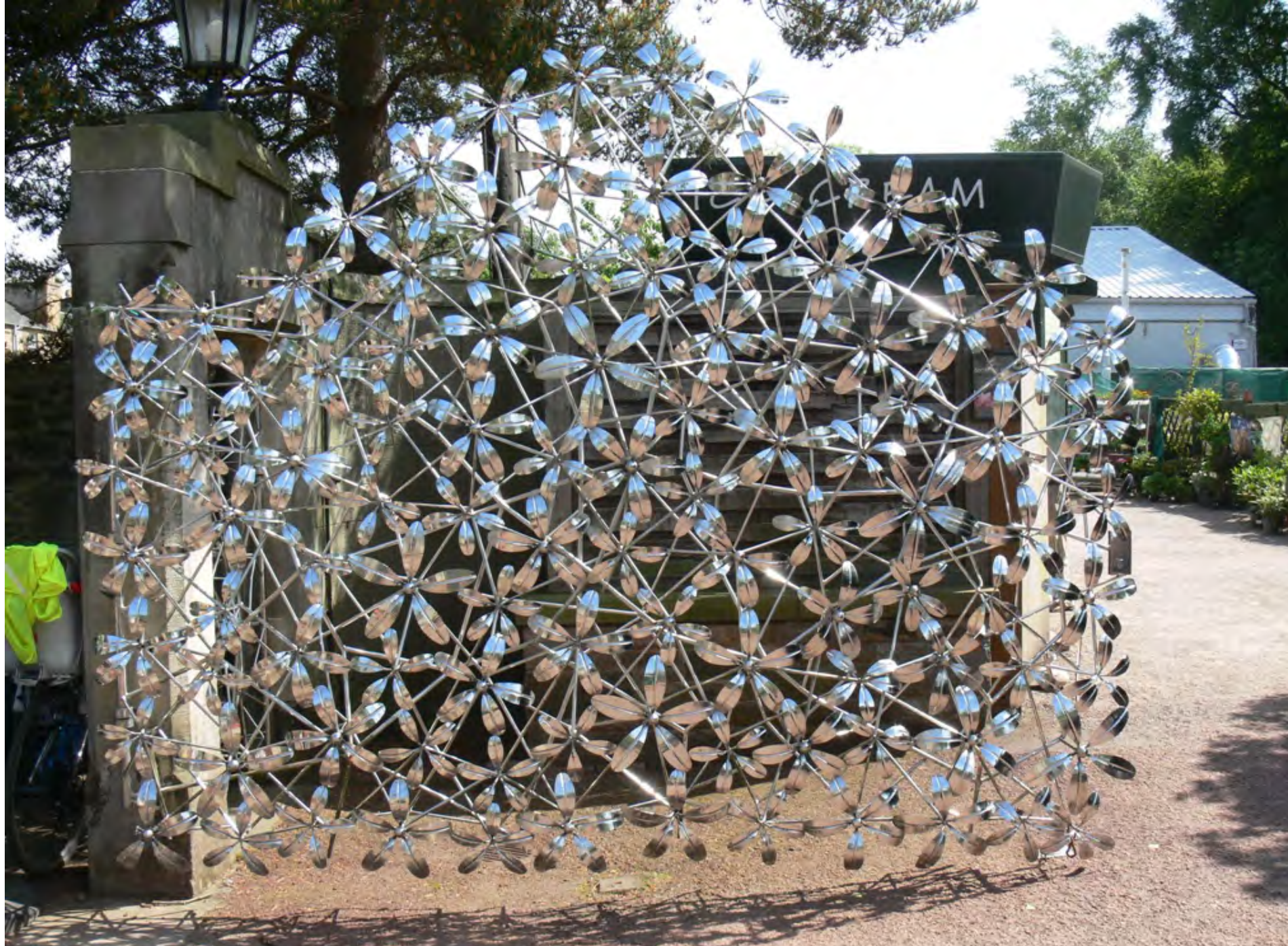
# Natural Analogues







# Biomorphic Forms & Patterns







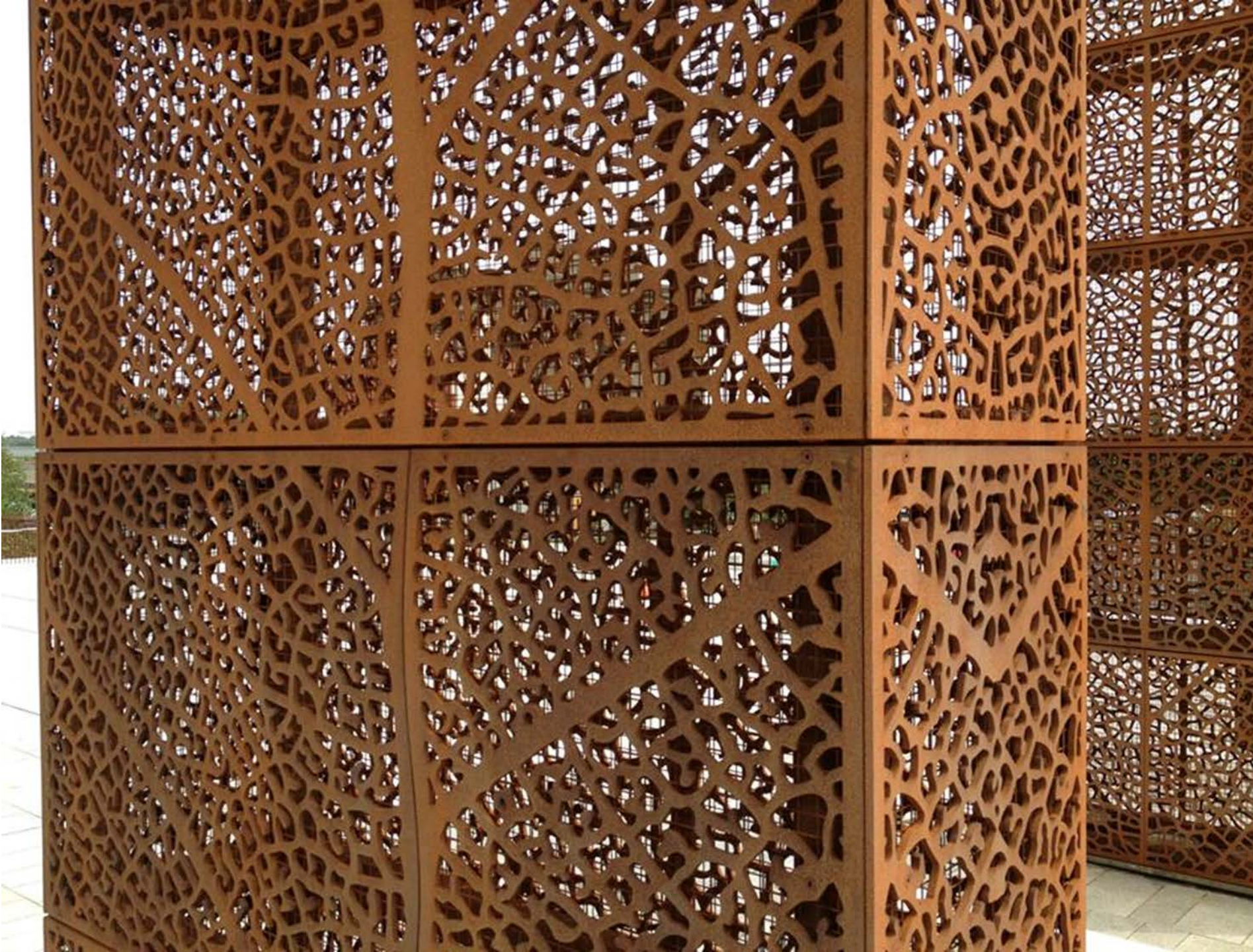
## Material Connection to Nature







# Complexity & Order







# Nature of the Space







# Prospect







# Refuge







# Mystery

wsp







Risk







# ‘Good’ Biophilic Design

“...spaces that are inspirational, restorative, and healthy, as well as integrative with the functionality of the place and the (urban) ecosystem.....”







**Question**

**Biophilic  
Edinburgh?**





**Question**

**Biophilic  
Edinburgh?**

**wsp**



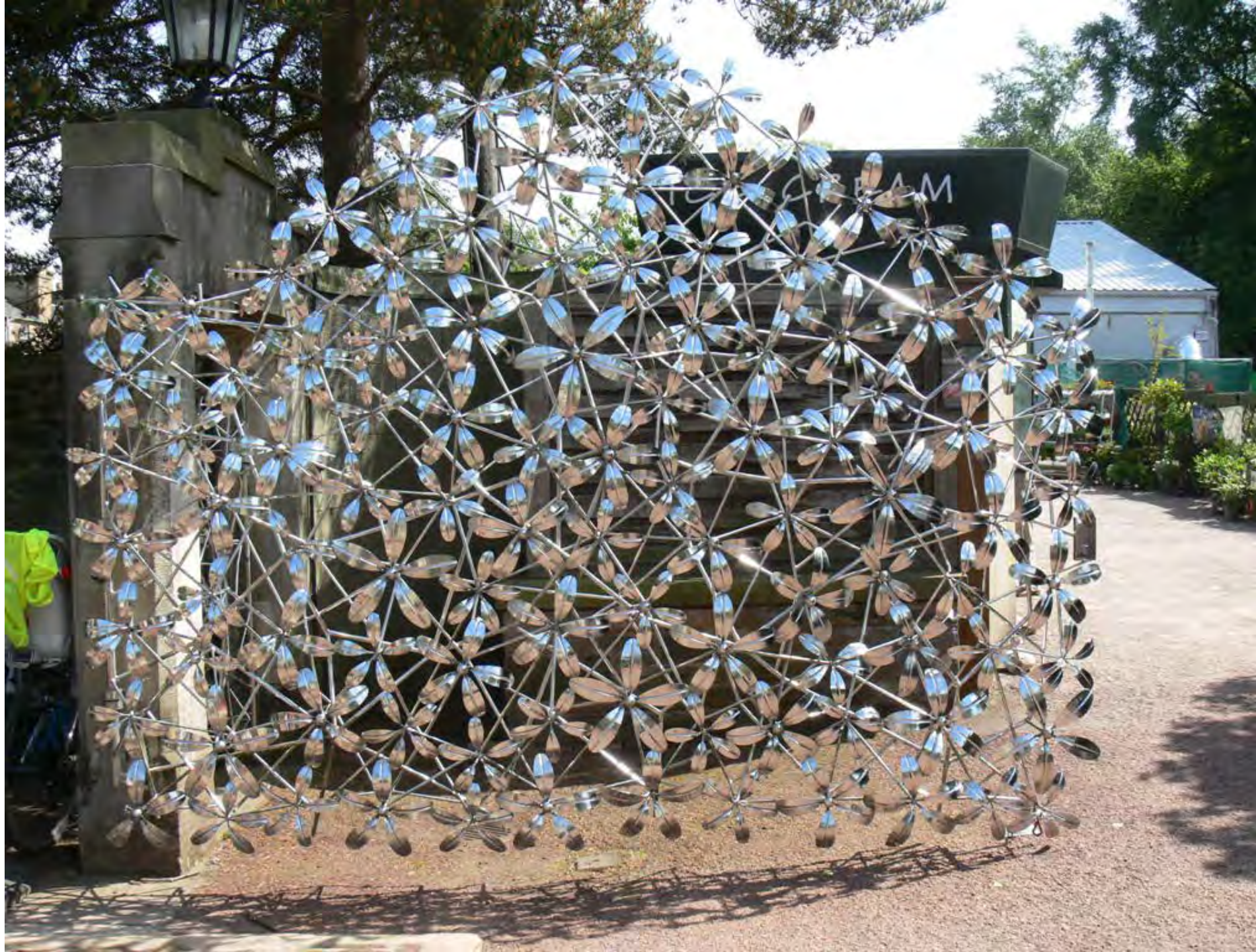




**Question**

**Biophilic  
Edinburgh?**

**wsp**







**Question**

**Biophilic  
Edinburgh?**

**wsp**







Question

Biophilic  
Edinburgh?







**Question**

**Biophilic  
Edinburgh?**

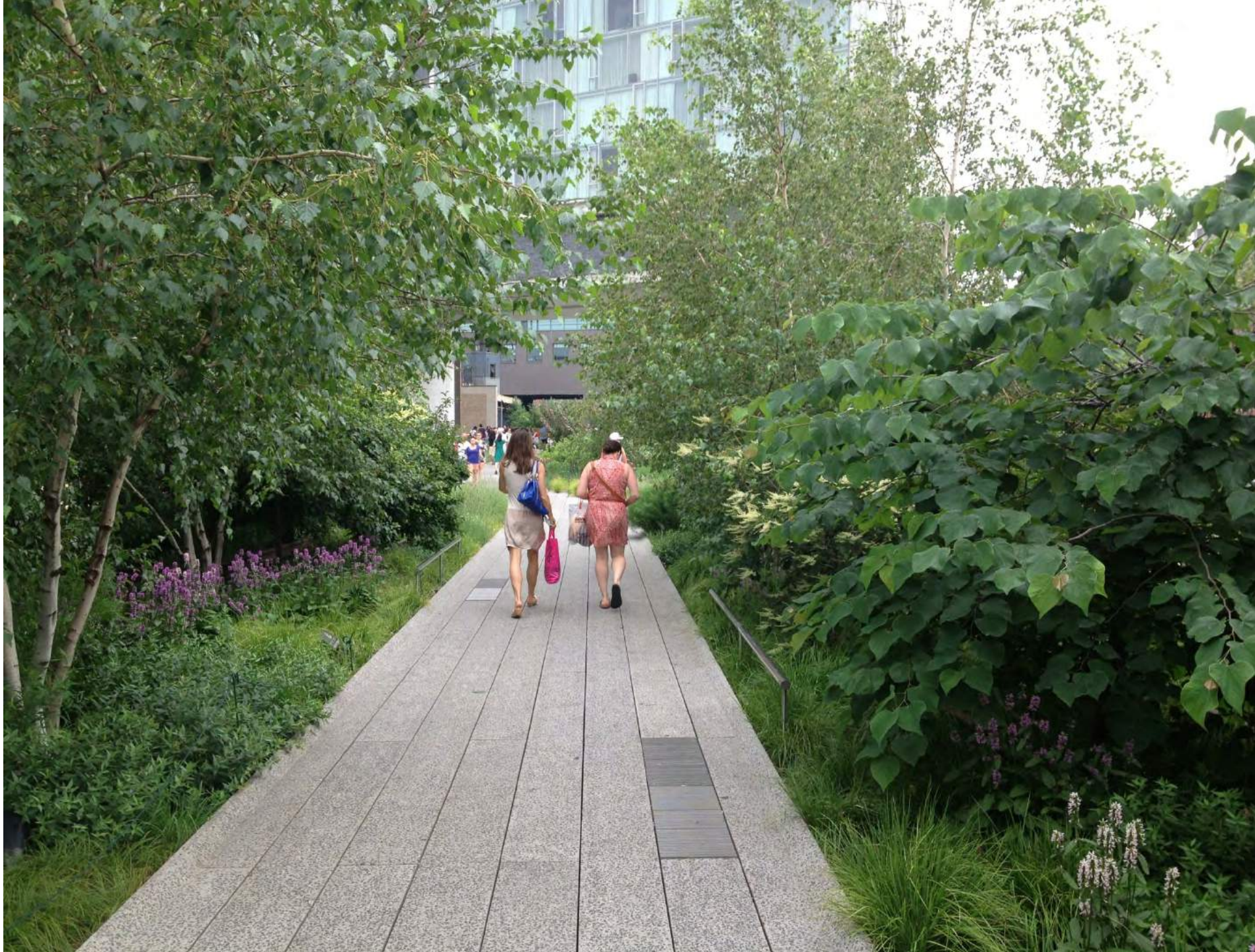
**wsp**







# Design Considerations - Implementation & Management







# Culture & Demographics







# Climate, Ecology & the Vernacular







# Existing (Un)Built Environment Character, Density & Typology







## Scale & Feasibility







## Maintenance & Tracking

wsp







# How Do I Create A Biophilic Environment?

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## Bridge the indoors & outdoors

- Who is the site for? – Identify the likely user groups, aim to be inclusive as possible, make sure nature is accessible to all
- What is the desired health response or benefit?
- What biophilic patterns / attributes already exist on site?
- Which are feasible to maintain / enhance?
- What patterns are feasible on site?
- Which patterns can produce the desired health response / benefit?
- What design strategies will I utilise?
- How will I monitor / record efficacy of the designed scheme over time?  
How can the scheme be managed to ensure efficacy over time?
- How will I plan to ensure a resilient, year round design that remains restorative if patterns / design elements fail or become latent due to seasonality?





# Cross-Platform Integration







# Focus on Biodiversity



*Sedum Roof, Dorset*



*Alder Hey Hospital, Liverpool*





## Link Internal & External - 'Borrow' Views







## Micro – Restorative Networks







**Real Nature  
Over 'Fake'  
Nature**

-

**'Fake' Nature  
Over No Nature**







**Involve  
Communities  
-  
Be Inclusive**

**wsp**







# Resilient Biophilic Environments







**Bring Nature  
into the Office?**

**Bring the  
Office into  
Nature!**







# The Missing Link in Sustainability?

“We cannot win this battle to save species and environments without forging an emotional bond between ourselves and nature as well – for we will not fight to save what we do not love”

– Stephen Jay Gould

