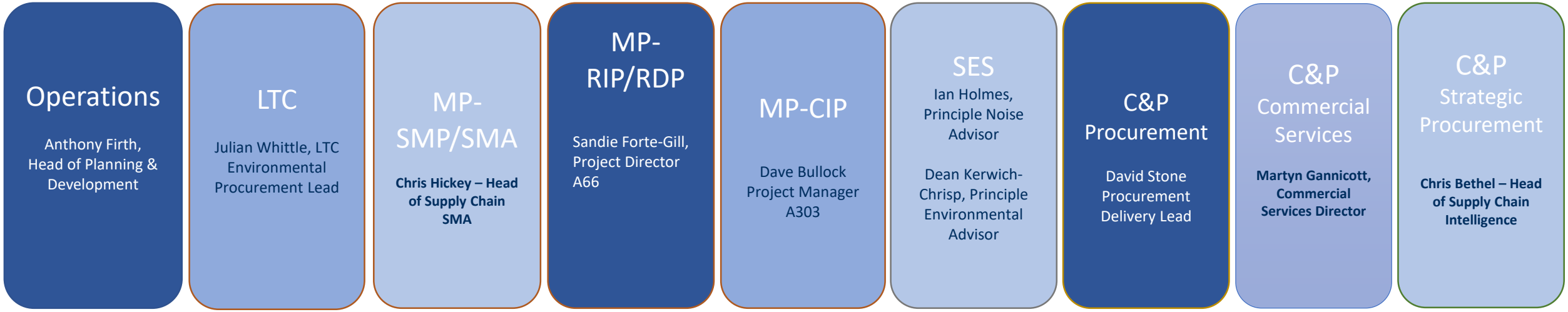
Strategic Procurement Strategy

Environmental (Noise) Barriers

Stakeholder Engagement



Business Area/Investment Programme:	Individual & Role:	Comment if required:	Review:	Date:
Executive Team – Panel Chair	Malcolm Dare - Executive Director C&P		Approval meeting	02/06/2021
Executive Team	Duncan Smith – Interim Exec Director Operations		Exec Review	25/06/2021
Executive Team	Peter Mumford - Exec Director Major Projects		Exec Review	25/06/2021
Executive Team	Mike Wilson – Exec Director SES		Exec Review	25/06/2021
MP – SMP/SMA Leadership Team	Mike Grant – Senior Responsible Officer (SRO)		Approval meeting	02/06/2021
C&P Leadership Team	Sanyalax Kelly - Strategic Procurement Director		Approval meeting	02/06/2021
C&P Leadership Team	Andrew Stephenson - Procurement Director		Reviewed	14/06/2021
C&P Leadership Team	Martyn Gannicott – Commercial Services Director		Reviewed	01/06/2021
C&P Leadership Team	David O'Neil – Supply Chain Director		Reviewed	27/05/2021
C&P Leadership Team	Mark Ollerton – MP Commercial Director		Reviewed	03/06/2021
C&P Leadership Team	Richard Cerruti – Operations Commercial Director		Reviewed	07/06/2021

Executive Summary

Aim:

To ensure that we install and maintain the best noise reducing products; assuring conformity, and improving safety, whole life costs, carbon, sustainability, durability, efficiency of installation, maintenance and design.

We recommend:

Only permitting products which are certified under Construction Product Regulations and which meet National Highways standards to be installed on the network.

Ensuring that product selections made on our behalf by accountable partners are in line with our aims.

Providing opportunities for suppliers of innovative products and techniques to develop those products and compete.

Communicating proactively with the supply chain and pre-empting escalations.

Achieved by:

Pre-approving products for inclusion in the Digital Products Catalogue (DPC) and Rapid Engineering Model (REM).

Procurement remaining with Operations and Tier 1 partners, using approved products and REM design

Innovative products being identified for development and given opportunities to compete

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Snapshot of our future vision

Short-Medium Term

Address the Pain Points:

- Contested selections
- Products are selected which are not durable
- Price driven Procurement

impacts

Shaping the market

- Populate the **Digital Product Catalogue** (DPC) with Environmental Barrier products which are moderated before inclusion:
  - Product Specifications, Certification, and Testing are checked and validated (possibly using 3rd party expertise)
  - Moderation formulates product information, including but not limited to; Performance, Carbon, and Durability
  - Suppliers may propose new or innovative products for moderation at any time
- Scheme requirements and DPC are combined in a **Rapid Engineering Model** (REM) to determine which products to evaluate:
  - Procurement remains with the principle contractors who run the competition for Tier 2 installers
  - Competitors will have to select from among standard REM product types
  - REM will assist with estimating the budget, and informing the designer early in the project lifecycle
- **Communicate the Strategy** to the supply chain (Client, Tier 1 contractor, Tier 2 installer, and Tier 3 product manufacturer)

Medium-Long Term

Realise the Opportunities:

- Better Design
- Improved Efficiency
- Reduced Carbon
- Save on Lifetime Cost

impacts

Shaping the future

- Strengthening the link between National Highway's imperatives and objectives, and the selections made by out Tier 1 partners, by:
  - Reviewing the Subcontracting provisions in NEC4 and Work Instructions.
  - Use of **Total Value of Ownership** (TVO), or alternative Cost, Quality and Social Value balanced process for evaluation to ensure that all parameters are properly considered and "hard wired" into the selection decision.
  - Criteria to include:
    - Safety, Customer impact and Logistical Efficiency of Installation of the product (considering concurrent works)
    - Durability and Lifetime cycle cost to purchase, install, maintain and recycle the product
    - Carbon and Sustainability
    - Design aesthetics (viewed from either side of the barrier)
- **Innovation** will be encouraged by:
  - Designating certain new and innovative DPC products as "Development", and allocating a proportion of programme investment to be on those products.
  - Inviting competitive bids for Innovation / Environment funding, and identifying suitable schemes for innovative solutions

Phased high-level Implementation Plan to deliver our key aims

Short-term
(RP2 Year 2)

- Communicate the Strategy
- Invite Product Submissions
- Digital Product Catalogue

Firstly, National Highways need to communicate the objectives and changes to come from this strategy along the supply chain.

Tangible action will follow; when Suppliers are asked to submit product information and certification for consideration for the DPC.

Products will go through a moderation process before (if successful) inclusion in the DPC and approval for use on the network.

Mid-term
(RP2, Years 2 & 3)

- Rapid Engineering Model
- Total Value of Ownership
- Stimulate Innovation

Introduce a Rapid Engineering Model where DPC product types are matched to schemes at Preliminary Design stage.

Strengthen product and supplier selection using TVO and a balanced scorecard, with Durability, Carbon, Efficiency of Installation & Maintenance, Aesthetics and Whole life costs considered.

Create demand for innovation through DPC development status, and HE sponsored competition for particular schemes.

Long-term
(Years 3-5 and beyond RP2)

- Safety, Customers & Delivery
- Innovative Products & Techniques

Better Investments in more Durable products will result in less frequent replacement benefiting **Safety, Customers and Delivery.**

Innovative Products & Techniques will become available, reducing Carbon and improving Sustainability and Manufacturing & Installation processes.

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Rollout by Workstream

Communication

- Audiences include NH Internal, Designers & Tier 1 Contractors, Tier 2 Installers & Tier 3 Manufacturers
- Communicate to Launch, Sustain & Embed change
- Messaging: To explain, gain buy in, set out a programme for change, and make it happen.

Benefits:

- NH signal for change, and our aims and objectives are made clear to the supply chain
- New and/ or disengaged suppliers are encouraged stimulating fresh competition.

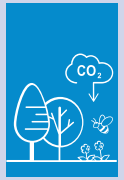
Procurement

- DPC; Process to invite product submissions
  - Digital by Design resource to implement
  - Ext. resource to validate certification (option)
  - Moderation panel
- REM; Digital by Design team to configure
- TVO; Collaborative working group with Tier 1 contractors & Operations (Scheme Delivery Framework)

Benefits:

- Only pre-approved products can be selected.
- Competition will be between the best products for each scheme.
- Carbon, Installation Efficiency, Maintenance, and Whole life cost (etc) will all be evaluated.
- Cost Reduction opportunities

Innovation



- Development status in DPC awarded by Moderators
- Work with Directorates / Programmes on % award
- Competitions for identified schemes for innovative products

Benefits:

- Stimulate the development of:
  - low Carbon products
  - Sustainable materials
  - Efficient installation
  - Integrated noise reduction with other structures

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Statement of Need

A Safer Network

Environmental (Noise) Barriers safeguard the wellbeing of families living close to the network

Improving Customer Satisfaction

Improving the lives of affected customers

Delivering the RIS

Delivered efficiently for Major Projects and Operations

The Requirements

- Barriers must be safely and efficiently installed on the network
- Barriers must be effective in reducing noise as specified for the location
- Barriers must be structurally sound (including wind loading)
- Barriers must be durable for a minimum of 20 years
- Barriers must be certified compliant with regulations (CE and soon UKCA marked)
- Barriers should be aesthetically appropriate considering their location and function

The Objectives

- Road noise mitigation for 7500 households in RP2 (KPI)
- Identify the optimal product range required for the network
- Identify and secure the route to market and supply chains for those products
- Identify any pinch points in supply and demand for products, and mitigate the risk
- Whole life costs and durability of products should be taken into account
- Installation and Maintenance should be safe, timely, and cause minimum customer disruption
- Sustainably manufactured products (Carbon, Responsibly Sourced, and Recyclable)
- Costs in alignment with estimates and budgets (or better)

The Challenges

- Barriers are a tier 2 procurement on an area basis under Operations delivery frameworks, and also in Major Projects
- Specifications have been interpreted differently and there has been questioning of awards
- Relationships with and within the supply chain have been tested and there has been tension
- Products and materials differ widely (Timber, Concrete, Steel, Plastics) all having different properties and attributes to encompass performance based specifications

The Outcomes

- A model of products which are approved for use in different circumstances (developed taking a balanced scorecard approach considering the factors above)
- Only approved and certified products are able to be installed
- A commercial and/or contractual basis for engaging with the supply chain
- A clear lead and direction given to the supply chain
- Feedback to estimating to allow for designated products as necessary
- Any supply bottlenecks anticipated and mitigated

Noise Barriers Category Strategy

Category Profile

Vision:

The best noise reducing products will be installed; improving whole life costs, carbon, sustainability, durability, installation efficiency maintenance and design.

Goals:

- National Highway's vision will be communicated to the supply chain.
- Products collated on the Digital Product Catalogue will go through a moderation process before being approved for use.
- A Rapid Engineering Model will be used to select product types by scheme
- Supplier selection will remain with our Tier 1 partners, using a balanced scorecard.
- Innovation will be stimulated to bring new opportunities

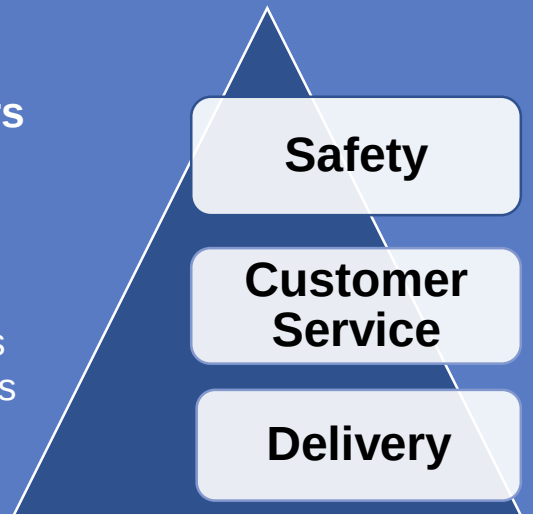
Business Need

Scope:

Environmental (Noise) Barriers

Opportunities:

- Digital Products Catalogue
- Rapid Engineering Model
- Whole life cost effective solutions
- Innovative products & techniques



Landscape:

- **Environmental (Noise) barriers are installed by Major Projects & Operations, often supported the Designated Fund for Environment.**
- **Systems and solutions vary (e.g. Materials include Timber, Plastics, Metals and Concrete, with significantly differing properties).**

Market Analysis

- **There are Suppliers of Barrier systems who manufacture and/or import, and who promote differing materials and systems**
- **Installation may be Barrier supplier or a contracted Installer**
- **Designers and Main Contractors select and procure Barriers, and may have differing interests to other stakeholders.**

Strategic Approach

Objectives	RP Yr2	RP Yr 3	RP Yr 4+
Communication	Communicate Strategy to the Supply Base – Initiate Change	Develop dialogue along supply chain & sustain change	Focus on products and innovation
Procurement	Approved products on DPC	REM, and TVO implemented	Installing better lifetime value products
Innovation	Development status on DPC	Competition(s) & Innovation funding	New products (Lo Carbon) available

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Business Requirements and Objectives

Requirement	Low Importance	1	2	3	4	5	High Importance
Assurance of supply	Disruption to supply has a minor impact on operations and / or brand perception						Security of supply is critical, disruption will affect safety and damage reputation
Quality	Quality issues have minimal impact on operations and/or						Quality performance has a major impact on our operations and/or brand
Regulatory, Ethical, Environmental	Compliance to ethical, environmental or regulations have a minimal impact on our operations or our brand						Compliance to regulatory, ethical and environmental issues has high impact on our operations and/or our brand
Service	Flexibility in delivery dates and service levels can be accommodated with minimal impact.						Late deliveries / poor service has a major impact on operations / brand
Cost	Cost competitiveness is not a major requirements.						Cost competitiveness is highly important for the business as is the ability to understand costs drivers of product / service
Innovation	R&D capability or investments in innovation has minimal impact on operations and/ or brands.						Excellent R&D / product engineers and investments to innovate are critical to our operations and/or brand

Conclusion:

Following safety of production, installation and operational life, the customers perception of service being delivered by a quality product achieving expected (or better) performance following assured methods are the highest requirements. Products need to be safe, functional and elegant.

HE	Specific Objectives
SES	• The goals of sustainable development shall be delivered throughout the design lifecycle. • A design solution shall take all reasonable steps to maximise contribution towards all goals of sustainable development. • The goals of sustainable development are set out on DMRB GG 103. All design activities and approaches shall apply the principles of good road design. • Good design can be summarised as safe, functional and elegant. • Principles of good road design are set out on DMRB GG 103.
SMA	• The Alliance to have direct access to Noise Barrier suppliers to contribute to design through Early Contractor Involvement (ECI) • Suppliers should work in an integrated way with other trades where possible • Emphasis on value rather than cost
RIP	• Aim for a catalogue of standardised products, manufactured offsite, and easy to install. • Cost certainty is important, budgets are set early • Evaluate options to support biodiversity
Ops	• Products should be durable and robust • Replacement of panels or sections should be possible with minimum disruption to customers

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Product Description

Name	Description
Timber	 The most prevalent material in use on the network. Timber fencing is the least durable, but is considered by some designers to be aesthetically favoured. Posts may be Timber, Steel or Concrete, and require concrete foundations sufficient for the wind loading.
Plastics	 Panels are made with high density composite material, which is recycled. Posts are normally Steel. Clear plastics are also a possibility, and PV's can be integrated into clear barriers to generate power 
Steel or Aluminium	 Shown (left) as an integrated Noise and Road Restraint Barrier. Some weathering steel (Corten) finishes have been controversial.  Rusty M27 motorway sound barri... The weathering steel wall installed alongside the M27 is inappropriate,... www.bbc.co.uk
Concrete	 Again, shown as a structure on top of a Road Restraint system. Absorbent Wood Cement mouldings may be mounted on Concrete or Aluminium panels. Outward facing sides can have a variety of finishes. 
Diffraction	 Diffraction structures deflect sound waves away from the affected recipient, creating a noise shadow. They have the potential to be lower than barriers, even flat; but may attenuate noise by lesser amounts. Can also be fitted to the top of other structures, such as existing barriers or bridge parapets.
Living Wall	 Aesthetically and environmentally attractive steel mesh or concrete structures which are filled with soil and are planted with appropriate species of plant (including ivy). Requirement for irrigation is an issue.

What if we selected products for:

Purchase price

Plastic
Timber
Aluminium

Mean:
Invest £ 250/m
Life cost £ 652/m
Carbon 352 kg/m

A £20M investment would build 80km of 2m high barrier

Whole life cost

Plastic
Concrete
Steel

Mean:
Invest £ 324/m
Life cost £ 609/m
Carbon 420 kg/m

80km of barrier would cost £5.9M more, but save £3.4M over 60yrs

Carbon (Life Embodied)

Plastic
Timber
Steel

Mean:
Invest £ 292/m
Life cost £ 688/m
Carbon 226 kg/m

Or, investing an extra £3.4M could avoid 4,800t of Carbon

Net lifetime carbon

PV power
(steel barrier with 20 year durability

Invest £ 899/m
Life cost £ 2,231/m
Carbon -848 kg/m

Or, an extra £51.9M for a net Carbon benefit of 67,800t

Estimates based on market submissions for 1200m of 2m high absorptive barrier.
The lifetime is assumed to be 60 years, and there is a high sensitivity to the manufacturers claimed durability, and consequent frequency of replacement.

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Product Characteristics Overview

	Carbon & Sustainability	Social Value	Ease of Installation	Cost of Manufacture	Cost of Installation	VRS Integration	Durability & Maintenance	Quality Control	Appearance	HE Familiarity	Innovation
Timber – Factory Assembly	++	++	++	££	££		●	+	Traditional	++	●
Timber – Insitu Assembly	++	++	+	£	£		●	●	Traditional	++	●
Plastic	++	++	++	££	££		+	+	Modern	+	+
Aluminium	+	●	++	£££	££		++	+	Modern	+	●
Corten steel	+	●	++	£££	££		++	+	Modern	+	●
Concrete	●	+	●	£££	£££	++	++	+	Modern	●	+
Green Wall	++	++	●	£££	£££		●	●	Natural	+	+
Diffraction	+	+	+	££	££	+	+	++	Reduced & Modern		++

++ Good + Neutral ● Poor

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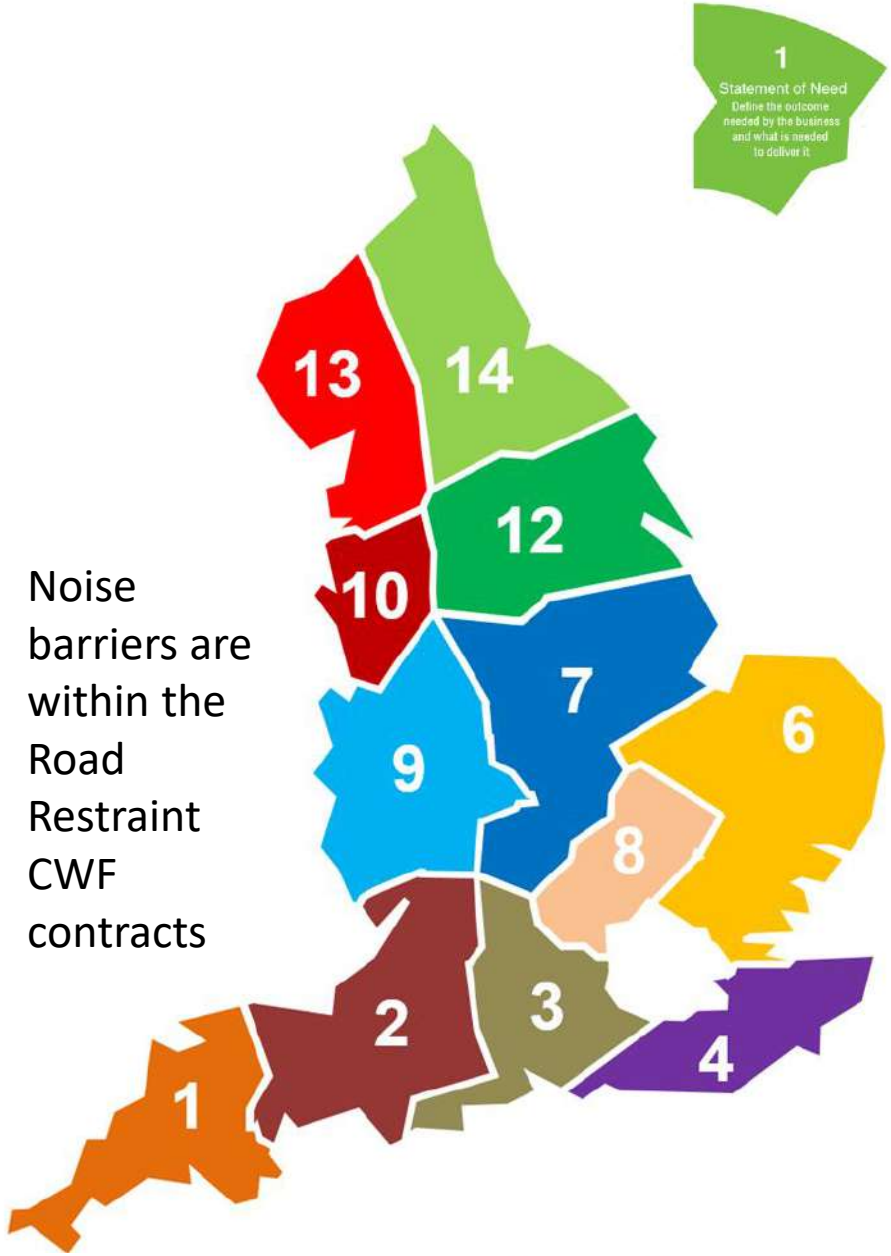
Current Sourcing & Contract Options

Delivery Model	Procurement Method	Advantages	Disadvantages
Operations / Asset Delivery	**CWF to transition to SDF** **Noise Barriers are provided by the road restraint contractor** **Limited Capex through designated funds**	Efficiency of using a common contractor who may combine Noise Barriers with other Works. Designated funds allow targeted improvements.	Procurement by multiple contractors on an area basis.
Smart Motorways Programme and Alliance	**Procured as a tier 2 supply by the alliance**	Procurement at programme level according to alliance ways of working. Alliance want a direct relationship with Suppliers and ECI	Some history of dispute between suppliers about the specification and certification of products installed by the SMP
Regional Investment Programme / Regional Development Partnership	**Procured as a tier 2 supply by Delivery Integration Partners (DIPs)**	Opportunity to co-ordinate our approach through Sustainable Supply Chain Group	There are many DIPs to co-ordinate, and there will be motivations to procure at lowest cost.
Complex Infrastructure Programme	**Procured as a tier 2 supply by the Main contractor**	Noise barriers are considered as part of the overall design of large and high profile projects	Tier 2 procurement
Lower Thames Crossing	**Designed has evaluated options. Main contractor will procure**	Noise barrier type selection has been considered in conjunction with a holistic view of the design	The solutions identified at design stage constrain competition

Conclusion:
Procurement as a tier 2 supply limits NH control and prevents us from maximising our leverage. On the other hand, Noise Barriers are a small proportion of NH spend, and procurement by other contractors allows the opportunity for efficient programming along with other works.

Direct procurement of NH framework agreements is not seen as proportionate if the opportunities and issues in the category can be addressed in collaboration with our Tier 1 partners.

Noise barriers are within the Road Restraint CWF contracts



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Value Chain Analysis & Innovation Reapplied

Designer	Foundations are poured concrete, into which posts & panels are built. Panel weight & dimensions determine lifting method	Import & assembly into a fencing system. Panels & Posts may be bought separately	Timber, Concrete, Steel, Aluminium, Recycles; with alternative supply chains.
Main Contractor	Installing Contractor	Manufacturer	Materials

Modern Method of Construction	Applicability
WLC: build & maintain	A significant consideration. Product lifetimes vary, and WLC should be considered
Standardisation: design & parts	Potential to standardise on approved products, with options for different applications
Digital Tools & Modularisation	Post & panel modular products are available
Offsite Build	Offsite manufacture is currently used for posts & panels
Logistics	Materials are suitable for marshalling offsite before calling up to site. Mechanical offloading is required, and lifting is dependent on material..
Installation	Foundations & posts are installed according to design & ground conditions. Erection is quite manual, and may require handling large panels, and appropriate traffic management.

HE Directorate	Value Objectives
Operations	• Barriers should be structurally sound (safe) and last for their design life with minimal maintenance. Impacts Safety, Cost, and Customer journey.
Major Projects	• Barriers should meet the scheme structural and environmental specifications • Barriers should be aesthetically acceptable with the design • Cost Efficient Delivery
Designated Funds	• Road noise mitigation for 7,500 households in noise important areas

Conclusion:

- There is no current Innovation Re-applied project dealing with Environmental (Noise) Barriers.
- The Strategy will recommends a Rapid Engineering Model for product type selection, and the use of the Digital Product Catalogue for approved products.

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Value Chain Analysis

Value Chain	Value Factors	Current Situation	Changes Needed
Identify and list the relevant step-by-step	For each activity, list the value factors (Highways England KPIs/targets) which are affected and describe what would	List what is wrong with the current situation against each activity (i.e. why maximum value is not being achieved)	List the changes needed to enable realisation of maximum value for each activity
Estimating	Efficiency	Estimates are based on timber - lowest spec and budget	Feedback to estimating on product options and costs and whole life value
Specification	Safety, Environment,	Regulations, HE spec & Scheme spec can be interpreted differently by Designers. Minimum acceptable is spec'd	Clarification, and communications plan for all tiers of the supply base. Include wider objectives.
Design	Safety, Environment, Efficiency, User Satisfaction	Design is normally functional, and not product specific	Clarity on design life of noise barriers, and product options available. Rapid design model to aid selection. Aesthetics
T1 Tender	Safety, Environment, Efficiency, User Satisfaction	Has to include product & installer. T1 selects T2 participants and may have preferred partners.	Product scope defined by Rapid design model, and Digital Product Catalogue (DPC)
Product Selection	Safety, Environment, Efficiency, User Satisfaction	Wide variety of solutions / choice. Budget limited. Selections are acquisition price driven.	Balanced scorecard approach, including whole life value. Use of Total Value of Ownership model.
Installer Selection	Safety, Efficiency	Opportunity to install with other structures missed. Installer tenders the product or system, and contracts for supply.	Selection based on installation efficiency, posibly combined with related works. Selection to remain with T1 & Ops.
Product Manufacture	Safety, Efficiency, Environment	Contract by contract, without dialogue with HE. No long term forecast of demand. Unknown carbon footprint.	HE to maintain a dialogue with T3 product manufacturers, and require full information for DPC
Product Logistics	Safety, Effieciency, User Satisfaction	Varying transport (carbon) and offloading requirements. Impacts on site traffic and control.	Logistics & Carbon to be included in selection. Aim to minimise impact on site and customer journeys.
Installation	Safety, Effieciency, User Satisfaction	Varies with post spacing, panel size, foundations etc., and impacts TM costs & customer journey	Installation effieciency considered at design & selection stage. Include in Rapid Design model
Maintenance	Safety, Effieciency, User Satisfaction	Manufacturer's claim zero maintenance, so not considered. Some examples of early failures	Agree asset life & maintenance regieme with Operations, and feed back actual performance to Rapid design model.

Show the relevant sections of the high level value chain map here

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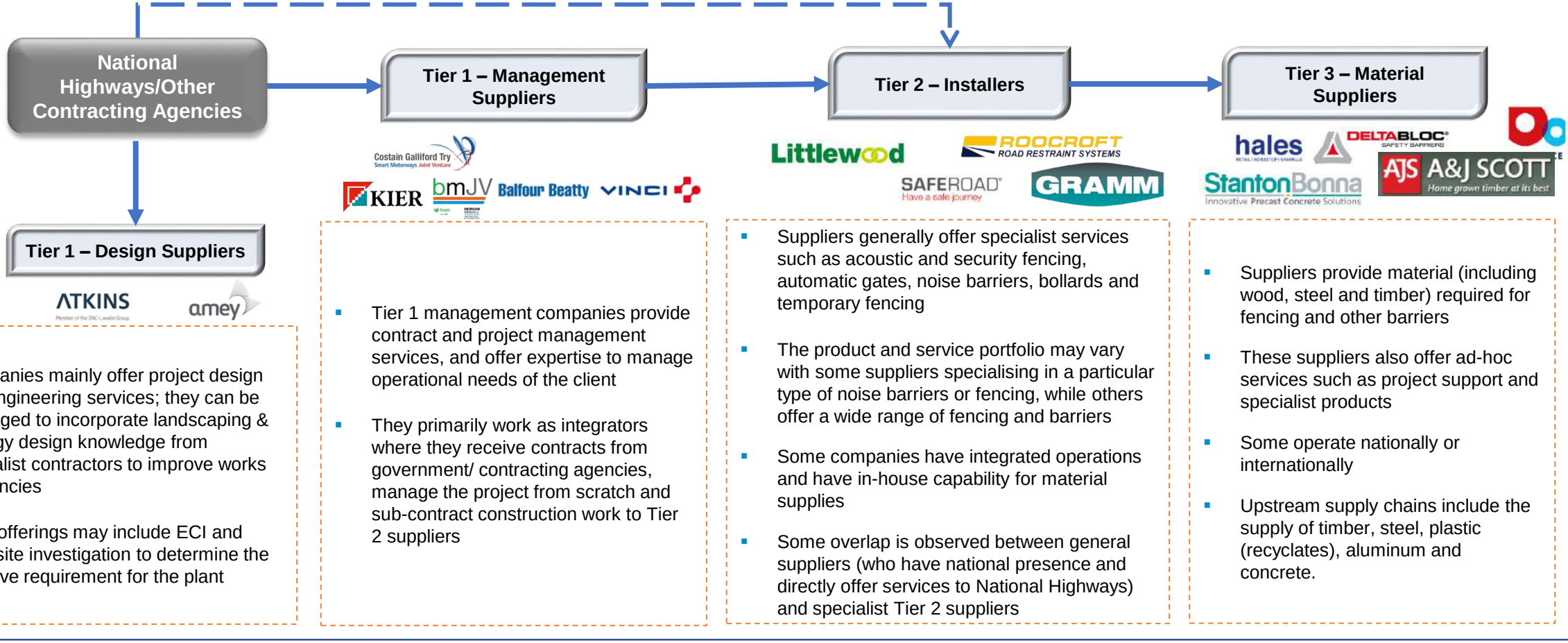
Supply Chain Mapping – value and objectives



- Companies mainly offer project design and engineering services; they can be leveraged to incorporate landscaping & ecology design knowledge from specialist contractors to improve works efficiencies
- Their offerings may include ECI and early site investigation to determine the effective requirement for the plant

- Tier 1 management companies provide contract and project management services, and offer expertise to manage operational needs of the client
- They primarily work as integrators where they receive contracts from government/ contracting agencies, manage the project from scratch and sub-contract construction work to Tier 2 suppliers

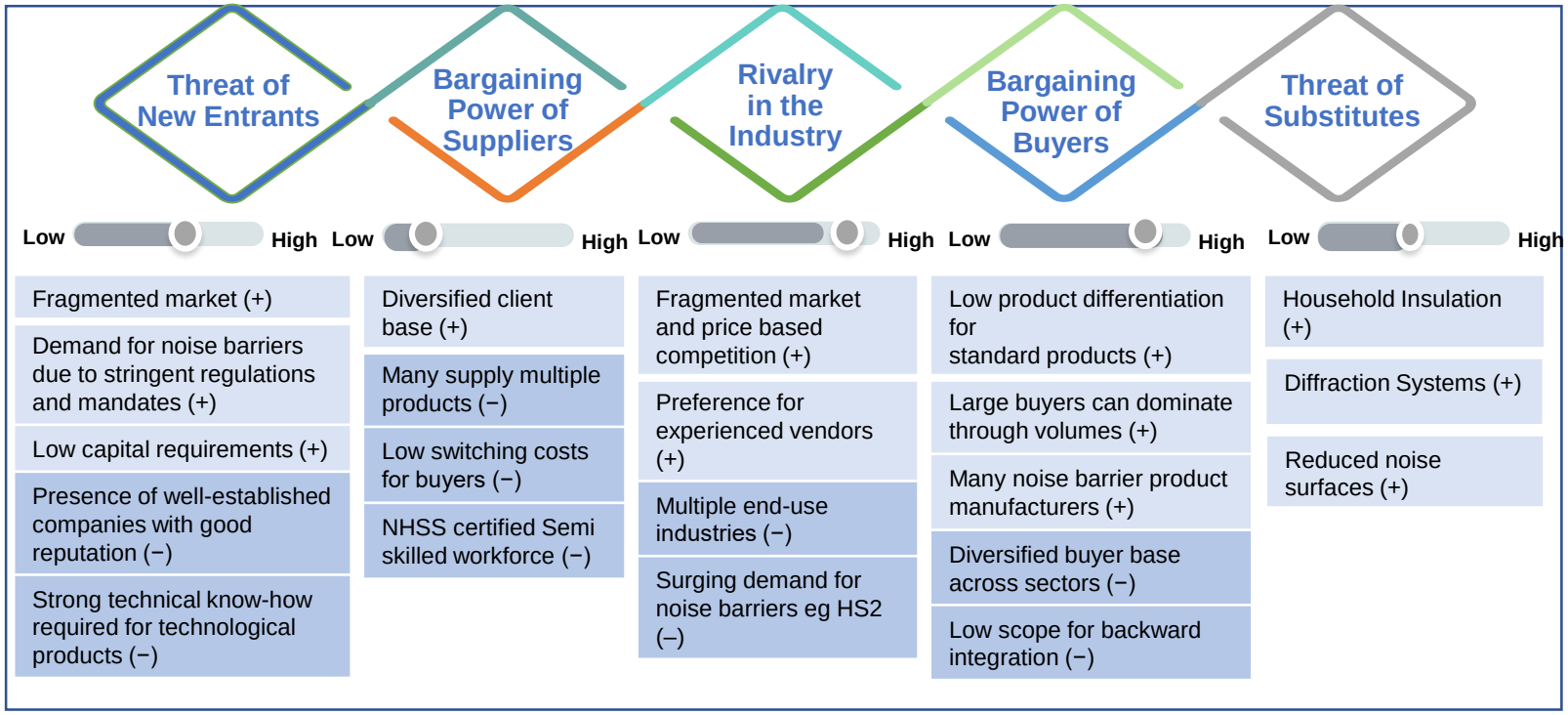
- Suppliers generally offer specialist services such as acoustic and security fencing, automatic gates, noise barriers, bollards and temporary fencing
- The product and service portfolio may vary with some suppliers specialising in a particular type of noise barriers or fencing, while others offer a wide range of fencing and barriers
- Some companies have integrated operations and have in-house capability for material supplies
- Some overlap is observed between general suppliers (who have national presence and directly offer services to National Highways) and specialist Tier 2 suppliers

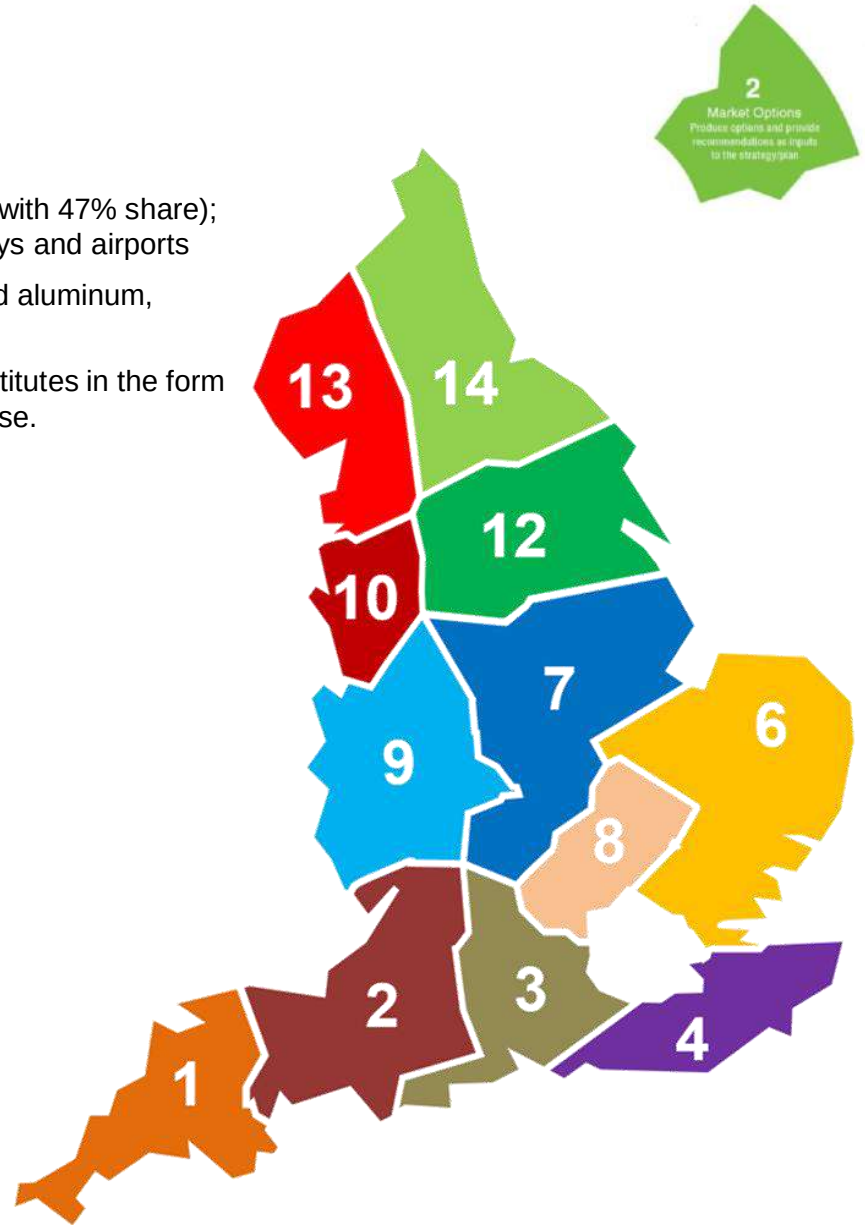
- Suppliers provide material (including wood, steel and timber) required for fencing and other barriers
- These suppliers also offer ad-hoc services such as project support and specialist products
- Some operate nationally or internationally
- Upstream supply chains include the supply of timber, steel, plastic (recyclates), aluminum and concrete.

Conclusion: National Highways should encourage innovation (use of advanced products and recycled materials) and efficient designs (dual-purpose structures serving both as a vehicle restraint system and environmental barriers) that can improve the efficiency of noise barriers; further NH should better engage throughout the supply chain to encourage a wider variety of products to be offered.

Market Insight and Landscape

- Europe is the second-largest market (with 30% share) globally for outdoor noise barriers, behind North America leads (with 47% share); this is driven by the stringent regulations and mandates imposed by the European bodies w.r.t noise from roads, railways and airports
- Large players offer a variety of noise barrier products including sound barrier wall systems made from, steel, galvanised aluminum, plastics, concrete or wood.
- Innovations include integrating with Vehicle Restraint barrier and PV electrical generation, however there are also substitutes in the form of Refraction or Noise Cancellation, and NH may choose low noise surfaces or to insulate individual homes against noise.





Conclusion: The UK noise barrier market is fragmented with presence of many manufacturers and installers. Pricing, product quality and design remain the primary criteria on which manufacturers compete, while other parameters include technological capabilities and range of products

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Supplier Engagement

Meetings took place with a selection of incumbent suppliers, and a Prior Information Notice (PIN) was published to ensure that others wishing to engage could do so.

Tier	Participants	Feedback
Designer	wsp	• Design output is essentially a functional specification based on NH standards and scheme requirements • Designers have access to noise modelling expertise • Aesthetic considerations are not normally a high priority, unless for compatibility with existing barriers • Would welcome automation and rapid design model – earlier and more efficient
Tier 1 Contractors (Meetings & RDP Sustainable Supply Chain Group)	OSBORNE GRAHAM RDP	• Follow the 3 Quotes rule >£10K • Operate within budget constraints • Tender to tier 2 installers rather than manufacturers • Validating certification is time consuming, and often requires clarification • RDP Sustainable Supply Chain Group preferred the “DPC / Rapid Design” option to “As Is” or “Framework T2 or T3” Options for the Strategy
Tier 2 Installers	SAFEROAD Have a safe journey Littlewood	• Often offer a range of products from different manufacturers (some commercial relationships in play) • Can source components (e.g. Panels, Posts) directly and so become the manufacturer • Many are involved in other Infrastructure programmes e.g. HS2 (who are more focussed on durability) • Highways market is perceived as price driven, and a preference for timber often becomes known in tenders • There are varying attitudes to sub contracting installation gangs
Tier 3 Manufacturers	GRAMM TILON CG Ltd DELTABLOC 4SILENCE HALES SAWMILLS NOISEstop ACOUSTIC SCREENS REINFORCED EARTH SUSTAINABLE TECHNOLOGY	• Certain companies made –ve comments about their competitors and/or called for NH to justify selections • The Highways market is perceived as price driven, those with higher end products do not get to compete • Innovations are expensive to bring to an uncertain market, and specifications can mismatch new products • Standards and certification requirements are confusing, and testing is expensive • Some have had little or no contact with NH, and welcomed our meetings, although some saw it as reactive • Input material prices are rising

Conclusion:
In the current commercial structure, National Highway’s aims and objectives do not reach through to installers and manufacturers.

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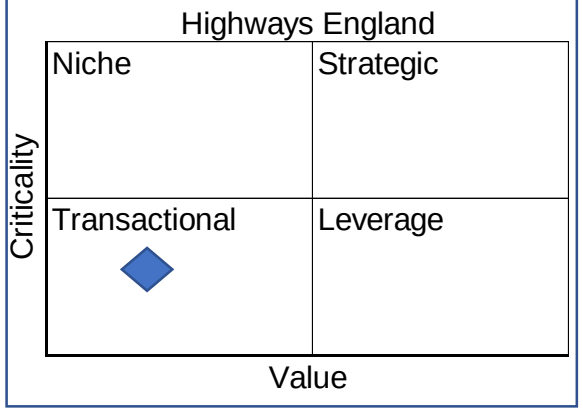
Supply Analysis

SWOT

Strengths (Internal to HE)	Weaknesses
Leading market client Leadership on Standards & Innovation RP2 Pipeline of work Designated funding available	Visibility of RP2 pipeline Indirect T2 / T3 Relationships with Suppliers Varying Procurement by Programmes and T1 Performance Specification has to fit many products with differing properties
Opportunities (External to HE)	**Threats**
Procure for Social & Environmental value Innovations Rapid engineering & standardisation Whole lifetime value approach	Conflict between Suppliers and challenges to specifications and standards Competing infrastructure demand UK market has been driven by acquisition price

PESTLE

Political	Economic	Social
Government policy of spending on infrastructure Brexit impact on product certification	Low interest rates Covid recovery	Safety Imperative Designated funding, and a target to reduce noise impact for 7500 homes Working from home (new normal) & traffic volumes
Technological	**Legislative**	**Environmental**
Innovative products; eg Diffraction or Noise canceling.	CE marking to become UKCA marking in 2022 (UK notified body testing) Construction Design & Management regs 2015 BS EN 14388 Road Traffic Noise Reducing Devices	Drive for zero carbon emissions Imported versus UK sourced materials Opportunities to use upcycled, or renewable materials Barriers with PV power generation



Conclusion:

To National Highways, Noise Barriers are a relatively low value T2/3 transactional supply item, sometimes installed with other barriers for reasons of efficiency. They are specialised, which pulls towards Niche status, however budget limitations and a competitive lower end market mitigate that pull.

Transactional procurement through National Highway's main contractors and T2 Installations contractors means that opportunities to build positive relationships with T3 manufacturers and suppliers are limited.

Suppliers are so varied that trying to categorise their interests is very specific. Many would like to develop National Highways as a strategic customer relationship, but are frustrated from doing so.

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Key Supplier Risks

Risk type	Risk Description	Impact	Priority	Mitigation/Action
Product & risk to Reputation	▪ There is a lack of clarity over specifications, standards, certification and testing among suppliers, and a potential for non-conforming products to be tendered. ▪ Suppliers have a history of escalating complaints about each other's products and certification	▪ Potential for disputes over Supplier & Product selection ▪ Early product failures	High	▪ Take a proactive role in moderating products to include in the Digital Products Catalogue, giving consistency and control, and separating the point of product approval from the procurement.
Financial	▪ Smaller Suppliers (SME's) are asked to guarantee long product lifetimes, which they may lack the financial strength or longevity to support	▪ Potential for future failures without a supplier to hold liable	Medium	▪ Balanced scorecard approach. It is desirable to work with SME's for reasons of Social Value and Innovation, and Financial strength must be considered in conjunction with other factors.
Supply Chain	▪ Competing demands from other infrastructure projects for products and for component materials	▪ Scarcity of supply ▪ Quality control	Medium	▪ The variety of products and materials used, and the opportunity to switch product and/or source internationally make failure of supply unlikely ▪ Quality aspects (e.g. ageing of timber) should be monitored where suppliers are known to be stretched.
Innovation	• Established specification and selection processes may not accommodate innovative products	▪ Difficult for innovative products to break into the market	Medium	▪ Development status for selected products ▪ Innovation funding and trial installations

Conclusion:
The Category Risk Profile can be improved by providing a clearer basis for product approval and selection.

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Category Opportunities

Strategic Themes	Opportunities	Benefits	Obstacles
Supplier Relationship Management	• Pre-approving (moderating) products for Digital Product Catalogue (DPC) • Establish new relationships with Tier 3 product manufacturers.	• Only DPC moderated products may be used • Scheme selections should not be challenged on grounds of certification or compliance • Able to have constructive dialogue about HE aims and objectives for products and their installation and maintenance.	• Resourcing the moderation process • There is a culture of challenge and accusation amongst certain sections of the supply chain • Need to preserve the commercial independence of Tier 1 and Tier 2 (Installers)
Sourcing Strategy	• Evaluate Whole Life Costs of products • Total Value of Ownership (TVO) procurement model.	• Cost Reduction opportunity • TVO will monetize non £ parameters, causing suppliers to compete to improve (e.g. Carbon)	• Vested interest of Tier 1 contractors to procure at minimum cost • Price may be higher at time of purchase • Estimates set a lowest price can create budget issues
Continuous Improvement	• Use of Rapid Engineering methodology	• Improved product type selected by scheme • Early and more accurate feedback to Estimating	• Possible challenges to the parameters and weightings of the REM
Innovation	• Use DPC development status to create opportunities for Innovative products • Host competition for development funding • Identify schemes where innovative products can be deployed, and incentivise innovation with meaningful orders	• New noise reducing technologies • Lower Carbon products & Installation • Use of Re-cycled & Sustainable materials • Integration with other structures (e.g. Road restraint barriers • Integrated power generation (Photo Voltaic)	• DPC & development status must comply with Public sector competition regulations • Competition must achieve Innovation and Environment designated fund criteria.
Performance Indicators	• Safety for all • Fast & Reliable Journeys • Well Maintained & Resilient Network • Delivering Better Environmental Outcomes • Achieving Efficient Delivery	• Evaluation of safety of installation by product • Products installed with less customer disruption • Durable low maintenance products • Noise mitigation & reduced Carbon • Reduce costs of maintenance & replacement	• Need to balance all criteria in the selection process • Interests of procuring parties

Conclusion:
The strategy will address the distraction of repeated supplier escalations by pre-approving the products which may be used; and then release opportunities to reduce lifetime costs (including maintenance and replacement), reduce carbon, improve durability and sustainability, and stimulate innovation.

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Category Strategy

Category Procurement Strategy	Description	Benefit	Action
Communication Plan	• Align NH Directorates and stakeholders with the strategy and form working groups to deliver the actions • Position the strategy with Designers and Tier 1 partners • Explain the strategy and rules of engagement to Tier 2 & 3 suppliers, and invite product submissions	• Action focussed teams with clear objectives • Get Tier 1 buy in for changes in procurement approach • Initiate change, and obtain product details for the DPC	• Identify resource commitments and agree timelines • Meetings and Presentations – e.g. Supply Chain Sustainability Group for RDP • Direct communication to incumbents and publish a PIN to the wider market
Digital Product Catalogue (DPC)	• Product details will be collated in the DPC and subject to moderation including validation of testing and certification (of product, assembled system, and component parts) against HE and regulated standards.	• Only approved DPC products will be procured • Consistent prior validation, not tender by tender • Procurement will be quicker with pre-validation • Suppliers may submit products at any time	• Working group with Digital by Design team • Consider validation by a qualified 3rd party as part of the moderation process • Invite product submissions from suppliers
Rapid Engineering Model (REM)	• A REM will be configured to calculate preliminary design requirements, and product type. A key input will be scheme lifetime, which will determine durability requirements for the product. Outputs to include product type to consider for selection.	• Product type will be determined according to scheme needs rather than standard minima or the commercial interests of others • Efficiency for designers and procurement • Improved budget information, earlier in the project	• Working group with Digital by Design team • Work with Estimating on the budget model
Balanced Scorecard	• Scheme evaluations, conducted by Tier 1 procurement and Operations to include: Whole life costs, carbon, sustainability, durability, installation efficiency maintenance and design.	• Reduced whole life costs, & more durable product • Reduced Carbon & Sustainable sourcing • Efficient installation & reduced customer impact • Reduced maintenance requirement • More of elegant design, appropriate to the location	• Explain NH objectives in communication plan • Review of NEC4 and Work Instructions, and NH approval, making clear what we want to achieve
Total Value of Ownership (TVO)	• TVO is a procurement mechanism where the parameters above are considered in a balanced way by monetizing non price parameters, and allowing bidders to see the impact of each on their offer.	• TVO ensures that all parameters are evaluated according to an agreed scheme. • Evaluation remains with Tier 1 and Operations	• TVO is being piloted for Drainage, so keep close involvement with that procurement • Alternatives such as Targeted Quality Mechanism may also be considered

Stimulate Innovation	• Innovative products will be identified for Development status during moderation for the DPC, and Programmes will be asked to commit to use a percentage of Development products.
	• Hold a competition for innovative product (e.g. low Carbon) to be developed and/or installed on a suitable scheme.
		• Suppliers will develop and certify products which:
		  • Perform better at reducing noise
		  • Reduce carbon / enhance sustainability
		  • Are safer, quicker and easier to install
		  • Integrate with other structures
		  • Are elegant designs
			• Confirm Development status rules with General Counsel
			• Clearly separate innovative & existing products in DPC approval procedures
			• Agree % Development with Programmes
			• Agree competition and criteria with Designated Funds (Innovation & Environment)

Carbon

The embodied Carbon calculated per product (slide 15) is not a full and comprehensive assessment:

- Suppliers provided quantities and weights (or volumes which were converted) for panels, posts and foundations.
- Tonnes of CO2 per product were calculated using emission factors per tonne of each material from the National Highways Carbon Tool v2.3 (which uses Institute of Civil Engineers data, shown below).

However;

- Carbon from transportation, transformation and installation, could only be assessed at scheme level, by ascertaining where materials originated and how they would be handled,
- Whole life Carbon would need to consider product durability (frequency of replacement), and carbon from material re-cycling,
- and the Carbon avoided by PV power generation is based on todays UK energy mix, which is changing year on year.

Embodied Carbon could be assessed to some degree in REM, to help determine the product groups, however a scheme specific assessment would be required to fully consider the Carbon impact of competing solutions.