

**The Delivery hub health, safety and environment**

**Raising the bar 26**

Whole life design for Health, Safety and Wellbeing

## Version 4 – September 2017

**Including comments by Kate Carpenter, Jacobs, and agreed with Lucy Wickham.**

These consider operational in-service safety issues I’ve experienced affecting local and strategic roads following strategic scheme delivery; issues in design development; handover; O&M; gaps between processes e.g. where GD04 meets RSA/NMU (as was) and safety governance etc.

My main suggestion is to ensure that the breadth of all programmes (CIP to minor improvements) and scheme types (technology to civils), and the widest scope of those affected are covered. At present this is orientated to major schemes, but could relate to smaller schemes delivered by maintenance organisations. The impacts should consider workers classed in GD04 as road users (as not HE-supply-chain but working on their network): emergency services, breakdown providers etc, who are easily forgotten. SMP has specific processes (core responders etc) to address these, but there does not seem to be similar documenting/liaison elsewhere?

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# Objective

Highways England’s Health and Safety 5 Year Plan sets its overarching safety objective as:

“No one should be harmed when travelling or working on the strategic road network”

Effective whole life design for health and safety makes a significant contribution to achieving this objective by managing the risk to all of those affected by Highways England’s activities, whether they are road workers, road users or others affected by the SRN (e.g. those living and working adjacent to it). The key lies in effective communication and collaboration; creating the right culture to drive the behaviors needed to achieve this objective throughout the whole life of a scheme, from option identification through to decommissioning.

The purpose of this document is to identify current best practice and to specify minimum and desirable requirements for design for health, safety and wellbeing. Minimum and desirable requirements are set out in the safety excellence wheel and matrix.

# Background

The most effective way of reducing health and safety risks is to design them out at source. Designers and stakeholders make decisions that influence and impact all stage of an asset’s life cycle including option selection, design, construction, operation, use, maintenance and decommissioning activities. Therefore, designers have a leading role to play in assessing and mitigating risks that can result in injury or ill health throughout the life of the scheme and the resulting asset.

There are also legal obligations, particularly the CDM Regulations, which mandate how projects should be delivered. It is a duty of the stakeholders to provide details of all health, safety and legal constraints that affect the project. Designers have the responsibility to review, communicate and integrate the constraints that affect the project and ensure their inclusion within the Pre-construction Information.

Designers have a responsibility to apply the principles of prevention to eliminate hazards and reduce the risks identified in each and every part of a scheme’s life cycle. (GD04 is particularly pertinent in this regard). Hazard elimination and safety risk management should be carried out from the commencement of the scheme, as decisions made early on can have a significant impact on the level of safety risk involved in later stages. It is important to recognise that there are often multiple designers involved in projects and that designers are often influenced by many parties who have varying interests in the scheme life cycle.

# Scope

This document applies to design for health, safety and wellbeing within all Highways England projects; these range from major schemes through to routine maintenance works delivered through the Asset Support Contracts. It applies to all scheme types including civil and technology.

Design for health, safety and wellbeing considers the impact of the proposed scheme on all who might be affected by it throughout its lifecycle, which includes pre-construction activities (e.g. surveys, stakeholder engagement), construction, hand-over, operation, maintenance and decommissioning / demolition. The populations likely to be affected are set out in GD04 and include road users (including emergency service, recovery operators, litter pickers working for other LHAs), road workers employed or contracted by Highways England, and other parties such as those living/working adjacent to the road (including adjacent networks such as other strategic or local roads or railways).

Design for health, safety and welfare includes, but is not limited to, activities carried out under:

* The Construction (Design and Management) (CDM) Regulations 2015
* GD04 – Standard for Safety Risk Assessment on the Strategic Road Network (SRN)
* HD 19 – Road Safety Audit (RSA)
* HD 42 – Non Motorised User Audits

Previous versions of this document have focused on the main duty holders under CDM (previously the CDM Co-ordinator). However, design for health, safety and welfare is a core aspect of the work carried out by all of those involved in design, not just the duty holders under CDM. Therefore this iteration broadens out the requirements to include all of those who are involved in design.

# This document

This document starts by setting out minimum and desirable requirements as set out in the safety excellence wheel and matrix.

It goes on to discuss current best practice and to provide guidance on the following aspects of design for health, safety and welfare:

* Leadership
* Contract and procurement
* Design management
* BIM
* Health and wellbeing in design
* Human factors
* Handover to maintenance and operations

# Designing for health and safety (safety excellence wheel):

The Highways England safety excellence wheel is a continuous improvement assessment tool in which design for safety forms one part.

This Raising the Bar guidance document suggests both minimum and desirable

performance indicators for each aspect of the design for health and safety section of the safety excellence wheel as shown below. These are set out in Appendix B.

The use of the safety excellence wheel by all parties needs to be consistently adopted in order that it is an important performance driver and measure for safer designs and safer sites.

Item 3 – add – through use of 3D visualization modelling. Item 5 change CDM-C to PD

We need to speak to Mark Bridges re updating the wheel



# Leadership

Highways England’s 5 year health and safety plan demonstrates that health, safety and wellbeing are at the heart of everything we do and defines how we should operate as a community. This should be based on a culture that embodies a genuine belief that we can become incident and injury free.

Health and safety leadership is a combined responsibility of the entire project team and requires clear / consistent communication that is cognisant of the needs and expectations of all stakeholders, with early engagement being key. Designers must adopt a mind-set that considers all aspects of health, safety and wellbeing including occupational health, human factors and system safety. We must embrace transitional change through innovation and technology to improve our health and safety in the design approach. This involves challenging standards and encouraging “thinking outside of the box”.

Designers should follow the safety governance and competency processes set out by Highways England.

Project leaders must ensure health and safety leadership provides suitable arrangements for managing a project, including the allocation of sufficient time and other resources. They must demonstrate that those appointed to work on a project are competent (in terms of skills, knowledge and experience). Organisations must have the organisational capability, necessary to fulfil their required roles.

All aspects of design must be driven by maintainability, operability, buildability and use requirements. A holistic approach to the whole life cycle must be encompassed by all designers at every stage, including financial and contractual implications.

Designers should not be allowed to transfer an identified risk or hazard without robustly evidencing how it has been addressed (eliminated or mitigated to the lowest reasonably practicable level) and who has the control to eliminate it. All residual risks must be communicated to the relevant stakeholders.

Client, designers, contractors, operators, maintainers and other stakeholders must cooperate and communicate with each other and coordinate their work collaboratively, being relentless in the process of hazard elimination.

We must create the environment that mandates continual improvement, via the use of both minimum and desirable performance indicators, for each aspect of the design, as shown in the safety excellence wheel in section x:

By adoption of the Highways England 5-year health and safety plan, duty holders, including designers, can show good health and safety leadership and improve the design risk management ~~hazard elimination~~ process. Some specific ways of doing this are:

* So far as is reasonably practicable (SFARP) undertake pre-design workshops with the operators and maintainers, considering users and other parties affected by the scheme, including once it is operational:
* Identify what currently works well and what doesn’t;
* Undertake regular workplace inspections of the site (be part of the Highways England project manager safety tour party as a minimum); and
* Designers / Principal Designers must be involved in any high potential / RIDDOR injury investigation (Inc. temporary works failures, asset failures and near misses which affect the design) to determine if the design could have prevented injury. Any lessons learnt shall be fed back through the appropriate forums.

**Contract & Procurement**

The Contracts and Procurement established by Highways England, including any pre-existing delivery vehicles, must consider the requirements set out in the 5 year health and safety plan, as well as the legislative requirements of CDM 2015. This applies to contracts for advance works (such as environmental surveys, ground investigations and topographical surveys) as well as major schemes and maintenance contracts.

The leadership must ensure the contracts enable compliance with CDM2015 and that:

* The Pre-construction Information provided by the client is validated;
* Any gaps can be addressed where appropriate;
* The contract allows resources to undertake the implementation of Raising the Bar requirements or instruct otherwise; and
* The contract considers responsibility for health, safety and welfare during handover of the project into operation including management of handovers phased by section, asset type or activity.

**Design Management**

The Design Management process must review the project Pre-construction Information and work with the Client to identify practicable mitigation to any gaps through survey and engineering.

Throughout the design process, the designer must consider the implications of design decisions on the health, safety and wellbeing of all of those affected by the scheme throughout its life, including users, maintainers and operators and contractors. These should be communicated into the PCI and H&S File.

Where practicable early contractor involvement may be of benefit as part of the design process through improved buildability, effective communication and coordination of risks and constraints. It is likely to be of most benefit when the early contractor involvement is carried out by the delivery partner rather than another organization, allowing them to bring their real life construction techniques and innovation ideas to the design process.

Designers must be an integrated part of the construction team; on hand to collaboratively resolve any design issues / changes that arise and record design change in a collaborative way.

A suggested check-list for every designer to consider is included in Appendix A.

**Better Information Management (BIM)**

In line with the UK Government Construction Strategy, Highways England committed to being Level 2 BIM compliant by 2016. BIM has the potential to be a valuable tool in identifying and managing risks throughout the project lifecycle.

A BIM Execution Plan (BEP) should be drafted (where applicable) on the inception of the project and agreed with the client. The BEP should incorporate the requirements of the client as set out in the Employers Information Requirements (EIR) and also ensure that the outputs set out in IAN 182: Major Scheme Handover into Operation and Maintenance will be met on completion.

The BEP integrates workflows to enable the design management process, this may include integrated design reviews, interdisciplinary design checks and the review of interdependencies of hazard information relating to the design. The BEP should be maintained, reviewed and updated during the life of the scheme and the roles and responsibilities clearly set out to ensure that the PIM (where applicable) contains the relevant health and safety information and is accessible to all members of the project delivery team and key stakeholders at all times. The aspiration is that the PIM Asset Management Handover model generated on completion of a scheme will be handed over to the Client and maintainer and form the portal by which all future maintenance asset data is captured to improve safety and network asset management.

Designers should seek to maximise the benefits of 3D digital technology (BIM and Geographical Information Systems (GIS)). The use of 3D visualisation allows all stakeholders to understand how the design will impact them. BIM enables virtual object modelling of both temporary and permanent works, construction prior to their physical construction, operation or maintenance in order to reduce uncertainty, improve safety, resolve issues, and simulate and analyse potential impacts. The ability to ‘see’ the finished product can help to anticipate and resolve problems whilst the works are still being designed, improving the overall design and reducing problems at later stages, such as Stage 3 RSA. Contractors can input critical information into the model before beginning construction to identify opportunities to pre-fabricate or pre-assemble some systems off-site and can consult maintainers and operators on the impact of the solutions. IAN 182 requires, from the outset, the development of Project Information Models PIM which capture all existing hazards and form a fundamental part of the pre-construction information. The PIM model should be a live entity which grows with the design, is handed over to the site delivery team, kept up to date at all times and captures asset data and residual hazard information on handover. Reference should also be made to PAS 1192 Part 6 BIM for Health and Safety.

Designers should consider the integration of risks and constraints through the application of asset related BIM application using PAS1192/6. Which will result in better asset related risk visualisation which are location specific.

Future BIM integrated projects should look at BIM with integrated programs of construction operation and maintenance which will further highlight areas where risks accumulate.

**Health and wellbeing in design**

National statistical data indicates a higher incidence rate of work related illness in construction, operations and maintenance than across all industries (there are 50 times the number of OH illness related deaths compared to incidents and 3 times the amount of days lost due to OH illness compared to injuries). Wellbeing is also a concern. The charity, Samaritans reports that construction workers are six times more likely to die from suicide than from a fall. The main risk factors include depression and mental illness, which can often be brought on by a stressful working environment, money worries, drugs and alcohol. Occupational health and wellbeing (as well as safety) should be an integral part of the design process. <http://www.hse.gov.uk/statistics/industry/construction/construction.pdf>

All those involved in construction work have a legal duty to manage construction health risks. <http://www.hse.gov.uk/construction/healthrisks/managing-essentials/essentials.pdf>

A designer must treat health and wellbeing like Safety in Design:

* Identify, prioritise and assess occupational health and wellbeing risks that arise from a design. Health risks may arise from sources such as vibration, noise, muscular skeletal disorders, contact dermatitis, occupational asthma, silicosis etc. Wellbeing risks may arise from sources such as stress, isolation and working arrangements.
* Eliminate the hazards so far as is reasonably practicable;
* Adjust designs to minimise health and wellbeing risks including identification of appropriate mitigations;
* Provide adequate information about significant risks associated with the design embedded within the design model (where available).

The following guides have been developed to support designers consider health in design and provide positive and negative indicators.

**Healthy by design –** [A guide for Crossrail design teams](http://74f85f59f39b887b696f-ab656259048fb93837ecc0ecbcf0c557.r23.cf3.rackcdn.com/assets/library/document/h/original/helathy_by_design_version_3.pdf)

**Office of Rail and Road -** [Positive and negative indicators of H&S by design](http://orr.gov.uk/__data/assets/pdf_file/0019/22159/positive-and-negative-indicators-for-health-and-safety-by-design.pdf)

As part of the whole life approach always consider how the asset is to be operated, used, maintained and subsequently demolished / decommissioned as this often presents significant challenges and risks.

**Human Factors in design**

Human factors is a technical discipline which seeks to understand human performance, behaviour, and why errors occur. Good design must take into account where, how and why people may make mistakes, in order to design to prevent these opportunities for error and manage them when they occur. Whilst a design might comply with standards, it may still not be intuitive to users; there are locations with high collision rates that are DMRB compliant but still clearly present difficulties for users. Operational safety specialists, with extensive experience of human factors, can help to identify the potential for human error allowing it to be eliminated or managed. Assets which are easily understood by users are safer and result in a more positive experience for the user (customer satisfaction).

Highways England acknowledges that many different user groups interact with its assets at different stages of the asset lifecycle, and that human factors plays an important role in delivering the Roads Investment Strategy. Highways England is setting out a vision to integrate human factors into every element of the asset life cycle including design. As part of this objective Highways England is developing processes to support the integration of human factors into all aspects of the asset lifecycle, including design. The outcome will be a better and more systematic understanding of users, in terms of what they need, what they want to do, and where they might go wrong. This understanding will be woven into the design, construction and operation of assets to which optimise safety, productivity and user experience. Certain technical areas have already integrated human factors into their processes; for example there is an updated PCF product on traffic management which incorporates human factors considerations.

Designers should seek to assess the impact of their designs on human factors. BIM visualization tools are likely to be of assistance in identifying possible problems prior to construction.

# Handover into Operation and Maintenance Activities

Designers can play a key role in eliminating or minimising risks associated with operation and maintenance activities. Early engagement with the end users and maintainers is essential to secure a safe whole-life outcome in the operation and maintenance of the asset.

Designers should follow the processes set out in IAN 182 to ensure smooth data transfer during project delivery and on handover into maintenance.

The information provided should include:

- Any residual health, safety and welfare risks

- Any assumptions that have been made relating to the way the asset will be operated, maintained and demolished/dismantled/upgraded (including demolition sequences and risk assessments)

- Any mitigations that have been provided to manage health, safety and welfare risks

- The interaction with any adjacent assets, such as local or strategic road networks or railways

Designers and Principal Designer should work with the Principal Contractor to ensure that accurate asset data is captured on the Highways England suite of databases prior to handover to ensure that assets may be maintained safely and inherent risks are understood. The current databases will in due course be linked to the IAM IS data management system and subsequently to the PIM Asset Management Handover model.

Operation and Maintenance Manuals are currently contained within the H&S File – this is currently under review by HE BIM Team.

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**Appendix A – Whole of life check sheet**

A suggested check-list for every designer to consider throughout the design is as follows:

**Pre-Construction Phase**

* 1. With respect to health, safety and welfare, how do you capture, understand and communicate hazards, risks and mitigations identified during the design of the scheme? How do you assess and record the implications of these risks for those affected these include users, road workers, those living and working adjacent to the road and those using adjacent assets (e.g. LHA roads)? How do you show how these have affected design decisions? How do you capture assumptions made about the operation and maintenance of all aspects of the asset, including civil and technology components?
  2. Do you have sufficient preconstruction information to undertake the design? Has the information been validated, to provide a sufficient confidence level in the information and what are the current gaps in this information? How have these been addressed with the Client?
  3. Do you ask for feedback from clients, users, contractors and suppliers, operators and maintainers from similar projects – what worked and what didn’t, have you consulted the [Highways England knowledge bank](http://webarchive.nationalarchives.gov.uk/20140603112028/http:/www.highways.gov.uk/specialist-information/major-projects-knowledge-sharing/knowledge-bank/)?
  4. How do you source and incorporate lessons learned and innovations from similar projects both internally and across other construction sectors?
  5. Can you evidence how you have considered the specific health and safety risks that relate to your design rather than just incorporate than the generic risks?
  6. Evidence how you effectively communicate any hazards not likely to be obvious to a competent contractor or other designers, which will be difficult to manage or unusual?
  7. Demonstrate how your design management process has highlighted any engineering concerns that effect H&S of workers including interaction with temporary works
  8. Confirm you have captured all relevant risks within your PIM model

**Construction Phase**

1. Do you have a structured design review process to reduce risk through requesting feedback on design issues and encourage constructive challenges?
2. Do you ask yourself ‘Would I feel safe constructing, maintaining and operating what I have designed?
3. Do you document lessons learned and feed them back within the project and to wider industry (e.g. [Highways England knowledge bank](http://webarchive.nationalarchives.gov.uk/20140603112028/http:/www.highways.gov.uk/specialist-information/major-projects-knowledge-sharing/knowledge-bank/))?
4. How do you communicate any residual risk clearly to the end user maximising the benefits of 3D data storage within the PIM Handover Asset Model in mind?
5. Can you demonstrate that the design risks have been integrated into the construction phase plan up to the works force risk management process?
6. Do you have an effective design change management process considering changes in site information or clashes?
7. What are we designing now that may be unacceptable tomorrow?
8. Did you work in a Lean manner to actively work with the PC to capture near miss and accident data, evaluate any design related hazards and capture the lessons learned

**Hand back and operational phase**

1. Is there a clear as built handover process?
2. Have you captured Residual risks?
3. Is the PIM Handover Asset Model fit for purpose?
4. Do you seek operational and maintainability feedback direct from the local operator (civils and technology) and any adjacent strategic or local road operators?
5. Do you seek operational and maintainability feedback direct from the local operator and maintainers? Was this feedback anecdotal or evidence based?
6. Do you undertake post project reviews, with the aim of understanding how well the design has fitted with the expectations of operators and maintainers? How do you ensure lessons are shared? Is operational performance fed back to the design team so that they understand how well their design worked in the real world?
7. Do you measure design performance at the construction and post construction phases of the project?
8. Has the designer provided design philosophy statements considering any engineering assumptions and constraints?
9. Has the designer considered future demolition, dis-assembly or integration into new/upgraded schemes (e.g. converting D3M to smart motorway or D2AP to expressway)?

**Appendix B – Safety excellence matrix**

Performance Level 1 Performance Level 2 Performance Level 3 Performance Level 4 Performance Level 5

Minimum Requirement Minimum Requirement Minimum Requirement Desirable Standard Desirable Standard

R1 - Relentless Hazard

Elimination through Design

Compliance with CDM regulations

Hazard Identification and elimination undertaken at commencement of, and throughout, design.

Client and maintainer fully involved in hazard elimination process and prepared to amend requirements to eliminate hazards

Client, Suppliers, operators, user groups and maintainers engaged and utilised at preliminary design stage to eliminate hazards

Hazard elimination integrated within design as a continuous full team-embracing process from preliminary design stage onwards.

Performance indicator

Evidence that client duties have been carried out.

Principal Designer appointed to

scheme and demonstrably

involved with the designer /

design process. Demonstrable

and evidenced engagement

within and across construction,

design and management-C

community as well as between

construction, design and

management-Cs and Highways

England project managers and

Designers

Evidenced through regular and meaningful liaison throughout the design process.

***TPBrown***

*2017-02-04 12:21:29*

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Some action needed to clarify these minimum requirements as they are not fully understood at present. Do you have to progress through the levels cumulatively or can you just do all the things in level 5 top achieve that performance level? Doug discussing level requirements with Mark Bridges

Application of design risk management template to schemes.

All Pre Construction Information

passed to principal contractor.

Design team meetings – should include: designer, Principal Designer, Delivery Partner (when appointed) / maintainer / client representative.

Ops TLG – monthly standing CDM agenda item. Provide transparency through use of the supply chain portal OSM TAG group.

Evidence of peer review of design

solutions

Evidence of audits to verify level

/ scope and extent of involvement.

Demonstrate all supplier involvement at preliminary design stage.

***TPBrown***

*2017-02-04 12:23:31*

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Sort terminology to fit regulations and guidance

Evidence of supplier involvement in hazard elimination and mitigation.

Develop ‘standard’ smart motorways hazard elimination schedule to give transparency across whole scheme lifecycle – separately consider preliminary design, detailed design, construction, operation and maintenance and

de-commissioning of scheme.

Include the need to seek feedback from the current operators and maintainers

– via questionnaire / workshop/ focus group etc.?

Hazard log maintained. Evidence that residual hazard information is included within the pre-construction information and includes detailed mitigation plans with agreed owners responsible for actions - at ‘no cost’ to the operation of the scheme.

Demonstrate that lessons learned forums based on designer/ contractor reviews (and peer reviews) are conducted – driving improvements in design to make construction safer and more efficient.

Evidence to demonstrate effective communication of risk between all the designers and stakeholders and the use of interdisciplinary design checks.

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|  | Performance Level 1 | Performance Level 2 | Performance Level 3 | Performance Level 4 | Performance Level 5 |
| Minimum Requirement | Minimum Requirement | Minimum Requirement | Desirable Standard | Desirable Standard |
| R2 – Pre-existing and Residual Construction, Operational and Maintenance Hazards Identified | Identified on Safety, Health and Environmental (SHE) box on drawings or in maintenance manual and maintenance philosophy prepared | Client and maintainer fully engaged in identified and mitigating residual risks. | Contractor fully engaged in identifying and mitigating residual risk | Key tier 2+ suppliers engaged and utilised at preliminary design stage to identify and mitigate residual hazards | Achieve a more comprehensive link and cross reference between Hazard Elimination schedule and (design) Residual Risk register. |
| Performance indicator | Demonstrate that notes on drawings are appropriately transcribed into the scheme hazard elimination schedule  – and evidence that they are disseminated within and between design organisations. Residual risk information should point  to where relevant information resides.  Construction phase plan – evidence that contractors have shared with one  another (and designers) across the programme – to disseminate best practice and lessons learnt. | Evidence awareness of CIVILS and OSM TAG within the HUB and their activities – (monthly standing agenda item for construction, design and management) and information repository on supply chain portal.  Evidence supply of appropriate and sufficient pre-construction information as well as gaps, where they are identified.  Evidence client (including operator) and maintainer involvement in the hazard identification, mitigation and elimination process.  Evidence that the construction phase plan assessment criteria have been shared across the programme | Evidence regular, collaborative engagement (Contractor / designer / maintainer) in the identification, mitigation and hazard elimination process.  Evidence that the balance between construction, operation and maintenance risks is recognised, understood and that appropriate decisions  (in accordance with GD/04) are made.  Undertake regular workplace inspections of the site (be part of Highways England project manager safety tour party as a minimum). | Designers to evidence identification of tier 2+ suppliers and that liaison has commenced with them to identify and mitigate residual hazards  Designers should be involved in any high potential / RIDDOR  injury investigation to determine if the design could have prevented the injury. Any lessons shall be fed back through all appropriate forums.  Evidence that relevant information in the scheme MRSS is adequately and comprehensively translated across to the scheme residual risk register and operational logs/registers.  Evidence of an integrated team  and co-location. | Evidence of collaborative engagement in the hazard elimination and residual risk identification and mitigation process. Evidence a holistic ‘whole life’ approach to Design for Safety – to include design, construction, operation, maintenance and decommissioning.  Demonstrate review of related residual risk registers from completed schemes and other relevant experience.  Strong evidence that the transfer of residual risk only takes place by exception. |

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| --- | --- | --- | --- | --- | --- |
|  | Performance Level 1 | Performance Level 2 | Performance Level 3 | Performance Level 4 | Performance Level 5 |
| Minimum Requirement | Minimum Requirement | Minimum Requirement | Desirable Standard | Desirable Standard |
| R3 - Planning and Designing for Safe Construction, Operation and Maintenance | Base Highways England Industry standards utilised and  communicated through AIPs and  design input statements. | Highways England and maintainer review planning and design  to deliver operational and maintenance (health and) safety | Contractor and key suppliers review planning and design to deliver construction (health and) safety.  Users, operators and maintainers review design to deliver safe operation and maintenance | Planning and design of temporary and permanent works delivered by integrated planning, design and construction scheme. | Safety drives planning construction sequence and design and decisions on the operating model |
| Performance indicator | The requirements of the CDM Regulations are complied with.  Demonstrate sharing and dissemination of ideas, best practice and lessons  learnt – through taking items and issues to appropriate technical and knowledge share groups | Evidence that once elements have been designed (as far as is reasonably practicable) to eliminate, initially, and then,  reduce, risks that these remaining risks should be transparently transferred to those constructing/ maintaining a structure with appropriate information.  Evidence level of engagement, liaison and interaction with the relevant maintainers | Evidence of co-located (‘multi-  disciplinary’) teams.  Evidence that users, operators and maintainers have reviewed the design and contributed to identification of hazards.  Designers should be an integrated part of the site team and be on hand to collaboratively resolve any design issues that arise on site.  Demonstrate consistency in respect of staff (cross-learning) working across stages of a scheme – to help the embedment of lessons learnt and the understanding and experience of the reasons behind  decision making. | Evidence consideration of whether the permanent design also be utilised as the temporary works solution  Evidence that designers  have integrated their thinking with contractors’ practical methodologies?  Evidence a holistic ‘whole life’ approach to design for safety – to include design, construction, operation, maintenance and decommissioning. | Evidence appropriate and comprehensive interaction between design and construction planning teams  Evidence designers approach  to design solutions and organisational culture that drives safe thinking and solutions  Achieve zero post project health and safety asset defects up to 12 months  following handover  No post handover monies required to make good the asset following the identification of foreseeable health and safety issues |

Tim G & David Garton / Steve Yates / Malcolm Shaw / Rob Butcher / Andrew Finch / David Benfield

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| --- | --- | --- | --- | --- | --- |
|  | Basic Performance Level 1 – K | Performance Level 2 - E | Performance Level 3 - S | Performance Level 4 - Ex | Performance Level 5 |
| Minimum Requirement | Minimum Requirement | Minimum Requirement | Desirable Standard | Desirable Standard |
| R4 Appropriate Standards Selected and Clearly Communicated | Compliance with CDM regulations with Principal Designer fully involved in design  review process. | Risks to Workers in deviating from standards identified, eliminated if possible and mitigated. | Risks to workers and users in deviating from standards identified, eliminated if possible and mitigated. | Changes to HIghways England / Industry standards which affect worker and user safety performance monitored and results fed back to HIghways England / Industry  and toolkit | Holistic decisions made in challenging standards to deliver improved worker and road user safety. |
| Performance indicator | Catalogue basic (minimum) sources of information for best practice in design – that all designers teams would be expected to have familiarity with and awareness of:   * CIRA 662 * CIRA 663 – workplace design * APS practice notes 2/13 * HSE website * Managing Health and Safety in Construction – CDM ACoP * Highways England   knowledge bank   * [vdesignforconstructionsafety.org](http://www.vdesignforconstructionsafety.org/) * [www.structural-safety.org](http://www.structural-safety.org/) * [www.safetyindesign.org/](http://www.safetyindesign.org/%20%20) * IAN 69/03 Asbestos   Management  • IAN 105/08   * IAN 69/05 Designing   for Maintenance  • IAN 166/13  • IAN 165/12   * IAN 149/11 existing motorway   minimum requirements   * IAN 115/08 Requirements and Guidance for works on the Hard Shoulder and Road Side Verges on High Speed Dual Carriageways. * GD/04 Standard for Safety Risk Assessment on the Strategic Road Network. Evidence awareness and use of own and other corporate Design for Safety initiative across the supply chain and beyond. (eg: Network Rail - Safe by Design initiative) | Evidence engagement with  and use of the HUB departures tracker – evidence active review of Department for Transport from a road worker risk perspective. (Note also the introduction of ICert for Type A and Type B departures).  Evidence use and application of the road worker safety assessment tool in the development, design and deployment of mitigations.  Experience with supervision | Evidence of awareness of and contributions to RoWSAF and AfZ.  Evidence of Client attendance /  engagement at review meetings.  Promote awareness and use of the road worker safety assessment tool.  Evidence cognisance with and practical application and understanding  of GD-04 techniques.  Independent | Evidence existence of an appropriate review and monitoring strategy pertaining to road  worker safety - in collaboration with designer / contractor and maintainer.  Evidence feedback process employed and provide examples (knowledge dissemination) of best AND bad practice.  Expert | Evidence existence of an appropriate review and monitoring strategy pertaining to road  worker safety - in collaboration with designer / contractor and maintainer.  Evidence local, Highways Agency and national contributions made to the challenging of standards and development of the design concept.  Knowledge Share |
|  |  |  |  |  |  |

Paul B & Pav S

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|  | Performance Level 1 | Performance Level 2 | Performance Level 3 | Performance Level 4 | Performance Level 5 |
| Minimum Requirement | Minimum Requirement | Minimum Requirement | Desirable Standard | Desirable Standard |
| Buildability reviews (designer/ contractor/Principal Designer) | Buildability reviews involving designer, contractor and Principal Designer carried out | Clear evidence that Buildability reviews have resulted in design changes which improve health and safety | Client and Contractor fully involved in buildability reviews to ensure base client requirements challenged and amended to improve buildability. | Key Tier 2+ suppliers engaged with buildability at preliminary design stage | Buildability reviews integrated within design process to ensure review of all key design decisions from preferred route selection onwards. |
| Performance indicator | Demonstrate through meeting minutes at every stage of design development. | Evidence that buildability reviews are carried out as part of the design process.  Demonstrate active and regular (integrated team) contact and collaborative working - including dissemination of ‘results’ into knowledge sharing communities | Evidence buildability and peer reviews and, where appropriate, challenge the base requirements.  Demonstrate interaction with the operators who experience ‘bad’ design rather than designers who are perhaps constrained by standards. | All tier 2 suppliers identified and contacts engaged.  Share accident Investigation (outcome) reports – identify where design was root cause. Demonstrate regular review of accidents / incidents and  embedment of lessons learnt into the design and planning process. | Consider shadow – audit on Highways England process etc by related industry experts – to share knowledge. |

**Principal Designer (PD)**

The PD must plan, manage and monitor the pre-construction phase and coordinate matters relating to health and safety to ensure that, so far as is reasonably practicable, the project is carried out without risks to health or safety.

It is recommended that the PD develop a scope of service in agreement with the client which integrates the design management plan detailed below:

* PD to work with the designer to develop the Design Management Plan;
* PD to work with the project manager to develop the Project Information Model (PIM) as detailed within IAN 182; and

The following section provides some key points that the HSE have used to review the effectiveness of the PD.

1. Determine the organisational understanding of the PD role and how it is delivered.
2. Determine how the PD assists the client for the purposes of developing PCI and assesses its adequacy.
3. Determine how the PD demonstrates that they have the SKE or organisational capability to accept the PD role and assess its adequacy.
4. Determine whether content and provision of PCI for all appointed designers and contractors, or those being considered for appointment, is adequate, prompt and in a convenient form.
5. Determine the adequacy of the PD’s mechanisms through which they ensure all duty holders co- operate and co-ordinate matters relating to health and safety in the pre-construction phase.
6. Determine whether the PD has an effective process for ensuring designers comply with their duties.
7. Assess the mechanisms for liaison between the PD and PC, and determine whether the information exchange is effective so that the PC has the right information at the right time, to enable effective planning of the construction phase (CPP).
8. Assess how the health and safety implications of late design changes are managed through the liaison arrangements between the PD and PC.
9. Assess whether the PD has defined an effective process for the PC to prepare, revise, update and handover the health and safety file.

# Legislation

[Construction (Design and Management) Regulations 2015](http://www.hse.gov.uk/pubns/priced/l144.pdf)

[(CDM) Approved Code of Practice](http://www.hse.gov.uk/pubns/priced/l144.pdf)

# Additional Information

Highway England Health and Safety 5 Year Plan

[Highways England Safety Excellence wheel](http://www.highways.gov.uk/our-road-network/safety/construction-and-maintenance-strategy/)

[Highways England Raising the Bar Guidance](http://www.highways.gov.uk/publications/major-projects-delivery-hub-health-safety-action-group/) GD04 – Safety Risk Assessments on the SRN

[IAN 69/15](http://www.dft.gov.uk/ha/standards/ians/pdfs/ian69.pdf) – Designing for Maintenance

HD 19 – Road Safety Audit (RSA)

HD 42 – Non Motorised User Audits

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***TPBrown***

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