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Development Bureau
Technical Circular (Works) No. 8/2025

Digital Works Supervision System

Scope

This Circular sets out the policy and requirements on the adoption of the Digital Works Supervision System (DWSS) in capital works contracts under the Capital Works Programme, with pre-tender estimate exceeding \$30 million and to be tendered on or after 1 April 2026. Capital works contracts tendered prior to 1 April 2026 shall implement the enhancements to the DWSS stipulated in this Circular as far as practicable.

Effective Date

2. This Circular takes immediate effect.

Effect on Existing Circulars and Circular Memoranda

3. This Circular supersedes DEVB TC(W) No. 2/2023.

Background

4. The Government is leading the construction industry to make change by implementing “Construction 2.0” advocating “Innovation”, “Professionalisation” and “Revitalisation” to uplift the capacity and sustainability of the industry, increase productivity, enhance regulation and quality assurance, improve site safety and reduce environmental impact.

5. As promulgated under DEVB TC(W) No. 2/2023, all capital works contracts with pre-tender estimate exceeding \$30 million and tendered on or after 1 April 2023 are required to adopt the DWSS to enhance the standard and efficiency of works supervision as well as the quality and safety of works.

6. With an aim to further uplifting the performance of capital works contracts, the Works Group Directorate Session of Works Policies Coordination Committee endorsed at its meeting in 21 July 2025 the policy to further enhance the DWSS through the promulgation of this Circular. The DWSS shall be enhanced with the following key improvements –

- (a) integration of a Smart Document Management component as a unified replacement for the Electronic Document Management System (EDMS) to facilitate electronic processing, storage, organization, and management of all formal project documentation, with enhanced workflow capabilities including advanced document review workflows and external reviewer support;
- (b) enhancement of Contract Management module to include Health Check data for New Engineering Contract (NEC) projects to facilitate proactive monitoring of contract performance and risk management;
- (c) provision of project team requirements to ensure adequate staffing for DWSS management and system integrity throughout the contract period; and
- (d) adoption of Artificial Intelligence (AI) technologies to enhance system functionality, data processing, and user experience.

7. Upon this enhancement, there will be three core functional components under DWSS:

- Workflow Management – Digitalised processing of mandatory forms and records with centralized database;
- Smart Construction Management – Data hub for collecting and integrating smart site application data for monitoring of safety¹, progress, deformation, material, machinery, environment, etc. ; and
- Smart Document Management – Centralized storage, organization, and management of formal project documentation.

Policy

8. Capital works contracts, including capital subventions contracts under Head 708, with pre-tender estimate exceeding \$30 million, shall adopt the DWSS. Bureaux/Departments should adopt as far as practicable the DWSS in other works contracts, such as maintenance and term contracts, with a view to strengthening works supervision.

Adoption of the DWSS

9. The DWSS is essentially a web-based centralised portal of collecting construction works information and managing the workflows of site activities and contract management to enhance efficiency, safety and quality performance. The DWSS is also the centralized platform for all different smart site applications deployed on site. The DWSS shall be accessible through secure network and operated on desktop and laptop computers and mobile devices.

¹ For the avoidance of doubt, for works contracts that adopt both DWSS and Smart Site Safety System (SSSS), the centralized management platform of SSSS shall be amalgamated into DWSS to be a integrated Smart Construction Management hub for centralized monitoring of different aspects on site including safety, progress, deformation, material, machinery, environment, etc.

10. The captured data shall be synchronised automatically across all devices and servers to support efficient flow of information including site records among contractor, site supervisory staff and employer/client, and enable timely reporting and alert of works progress and performance.

Design Stage

11. The DWSS shall form part of the proposal for contract computer facilities under the Project Administration Handbook. In preparing the contract specification, the employer/client and/or the consultants shall refer to the reference specification at **Annex A** which sets out the basic requirements of the DWSS. Contractors shall no longer be required to procure separate Electronic Document Management Systems, as the Smart Document Management component within the DWSS fulfills these requirements. Apart from the mandatory components and modules as stipulated in Section 1 of the reference specification, additional provisions or enhancement to the reference specification may be imposed to address specific requirements of individual works contract if justified. The employer/client and/or the Consultants shall take into account the nature and scope of works contract, establishment of site supervisory staff, availability of mobile network and Wi-Fi provision in construction site, etc. Approval of the DWSS specification shall be sought from an Approval Officer as required under the Project Administration Handbook.

12. The estimated cost of the DWSS would normally not exceed \$1.5 million or 1% of pre-tender estimate of the capital works contract whichever is higher, with a cap of \$10 million. If the aforementioned limit is to be exceeded, approval from an officer at D2 rank or above shall be obtained. For the avoidance of doubt, the estimated cost of the DWSS² shall not form part of the estimated cost of contract computer facilities under the Project Administration Handbook.

² Whilst the DWSS provides a centralized platform to collect and consolidate data from different smart site applications, the provision of these smart site applications does not form part of DWSS.

Construction Stage

13. The employer/client's representative³ shall review Contractor's DWSS proposal against the contract specification and seek employer/client's endorsement before accepting the DWSS proposal.

14. The employer/client's representative shall appoint a project team member, at least in professional rank or equivalent, to oversee the DWSS and ensure proper operation and system integrity throughout the contract period.

Completion of Contract

15. Upon completion of the contract, the DWSS shall be handed over to the employer/client for record and facilitating future operation and maintenance works.

Technical Audit

16. As the DWSS is of high importance to the contract management and site supervision of capital works contracts, a standard item on the proper adoption and use of the DWSS has been added to the technical audits of capital works contracts.

Interface with Integrated Capital Works Platform

17. The Development Bureau is developing in phases the Integrated Capital Works Platform (iCWP) to collect and consolidate data from the DWSS and other digital systems for continuous monitoring and data analysis such that the overall management and performance of capital works projects could be further enhanced. Selected data from the DWSS shall be standardised and transferred to the iCWP according to the Data Standardisation Report for the

³ Employer/client's representative means the Architect, the Engineer, the Supervising Officer, the Project Manager or the like as defined under the contract.

DWSS⁴, which is a living document with future updates by the Development Bureau as appropriate.

Exemption

18. On exceptional grounds, the Head of the department concerned may exempt the adoption of the DWSS as required under this Circular due to, for example, substantial impact on project delivery or projects of little works content.

Enquiries

19. Enquiries on this Circular shall be addressed to Chief Assistant Secretary (Works) 1.

(Ricky C K LAU)
Permanent Secretary for Development (Works)

⁴ The Report is accessible at the DEVB website

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System Requirements for DWSS

PART A: SYSTEM OVERVIEW, ARCHITECTURE & AVAILABILITY

1. System Description and Components

1.1 Digital Works Supervision System Overview

1.1.1 The Digital Works Supervision System (DWSS) is a centralized construction management platform designed to manage the workflows of submission and approval processes and to enable efficient contract management, supervision, and monitoring of construction sites.

1.1.2 The system should be built upon three core functional components:

- i. **Workflow Management** – Digitalized processing of mandatory forms and records with centralized database
- ii. **Smart Construction Management** – Data hub for collecting and integrating smart site application data
- iii. **Smart Document Management** – Centralized storage, organization, and management of formal project documentation.

1.2 Workflow Management

1.2.1 The DWSS Workflow Management incorporates a workflow-enabled application system consisting of six mandatory modules:

- i. Request for Inspection/Survey Check (RISC) Form;
- ii. Site Diary/Site Record Book;
- iii. Site Safety Inspection Records;
- iv. Cleansing Inspection Checklists;
- v. Labour Return Record; and
- vi. Contract Management

1.2.2 The system shall facilitate digital processing of required forms and records with one centralized system. Detailed functional requirements for each module are specified in Section 7 (Workflow Management System).

1.3 Smart Construction Management

- 1.3.1 The DWSS shall include a Smart Construction Management data hub to collect, consolidate, and centralize data from all different smart site applications deployed on site, such as Internet of Things (IoT) devices, remote sensors, artificial intelligence (AI) applications, and smart carry-on devices, etc. It should serve as the centralized hub to capture and consolidate data available from all smart construction applications to facilitate continuous monitoring and analysis, aiming to enhance the performance in safety, sustainability, progress, and quality of the site works.
- 1.3.2 Examples of smart site applications include progress monitoring, safety monitoring, deformation monitoring, material monitoring, machinery monitoring, and environmental monitoring (refer to Section 8.2.1 for more examples).
- 1.3.3 The Smart Construction Management serves as the hub for real-time monitoring and analysis to enhance performance in safety, sustainability, progress, and quality. Detailed requirements are specified in Section 8 (Smart Construction Management).

1.4 Smart Document Management

- 1.4.1 The Smart Document Management (SDM) is a web-based, workflow-enabled application system to facilitate electronic processing, storage, organization, and management of all formal project documentation including incoming/outgoing correspondence, submissions, drawings, specifications, and reports.
- 1.4.2 The SDM provides document storage with digitalized submission workflows for all formal project documentation. Detailed functional requirements are specified in Section 9 (Smart Document Management).

1.5 Use of Artificial Intelligence

- 1.5.1 The Contractor is required to incorporate appropriate Artificial Intelligence (AI) technologies within the DWSS to enhance system functionality, data processing, and user experience. AI applications may include: (i) Automated document classification and tagging, (ii) Predictive analytics for site progress and safety alerts, (iii) Intelligent routing and prioritization of workflow tasks, (iv) Natural language processing for comment summarization and search optimization, etc. Detailed mandatory requirements would be provided in separate technical circular on AI applications.

- 1.5.2 All AI features implemented shall comply with the employer/client's data privacy and security policies, as agreed with the employer/client's representative, and be clearly documented in the DWSS proposal.

1.6 System Accessibility

- 1.6.1 The DWSS shall be fully accessible via a web-browser by a desktop or laptop computer with secured internet connection (HTTPS) without physical or geographical limitation. No other desktop software or licenses shall be required to access the DWSS.
- 1.6.2 The DWSS shall support English display and input. If requested by the employer/client's representative, the DWSS shall support multi-language display, including Traditional Chinese, automatically according to the language settings of users' internet browser and mobile devices.
- 1.6.3 The DWSS shall be fully accessible by a Mobile App on iOS and Android operating systems through internet connection. The Mobile App shall be a native application capable of implementing native libraries on mobile devices such as camera, GPS, messaging, alert, and notification directly.
- 1.6.4 The Mobile App installed on mobile devices shall support the input, storage, and retrieval of data, photographs and/or attachments into/from a centralised database storage for workflow management, smart construction management and smart document management

1.7 Data Management and Standards

- 1.7.1 All captured data shall be stored in its original format (including but not limited to textual, numerical, date & time, locations) in database fields to support direct indexing, searching, filtering, and reporting purposes.
- 1.7.2 All data collected shall be made available to third-party applications, including but not limited to Integrated Capital Works Platform (iCWP), through Application Programming Interfaces (API) or Web Services (e.g., RESTful) within 24 hours. Dataset transferred from DWSS to iCWP shall be standardized according to the Data Standardisation Report as referred in the Technical Circular (refer to Section 11 for API requirements).

1.7.3 The DWSS shall use a database management system with data stored in textual, numerical, date & time, and locations format to support direct indexing, searching, filtering, reporting, and exporting purposes. Textual data in the database fields for forms or records shall be stored in English.

1.7.4 The DWSS shall support display and capture English characters in UNICODE standard on forms and database fields.

2. System Architecture, Hosting, and Performance

2.1 Hosting Environment Options

2.1.1 The DWSS servers may be hosted at (i) Site office, (ii) External data centre, and (iii) Cloud-based environment

2.2 Site-Hosted Systems

2.2.1 For DWSS servers hosted at site office, the system shall be:

- i. Protected and separated from other systems by firewall (e.g., trusted zone, DM zone) and/or Virtual Private Network (VPN); and
- ii. Configured to meet requirements of data confidentiality, system integrity, system availability/accessibility, and data privacy as agreed with the employer/client's representative

2.2.2 For site-hosted systems, the Contractor shall set up failover servers to ensure system redundancy and recovery capability.

2.3 Data Center and Cloud-Based Systems

2.3.1 For DWSS servers hosted in data center or cloud-based environment, the Contractor shall ensure the selected hosting solution is:

- i. Configured, deployed, and managed to meet data confidentiality, integrity, availability, and privacy aspects in compliance with globally recognized industrial security standards
- ii. Compliant with standards such as TIA-942 certified Tier 3 data center and

- 2.3.2 The Contractor shall provide up-to-date independent auditor reports for achieving internationally recognized certifications (e.g., ISO/IEC 20000, ISO/IEC 27017) to demonstrate the cloud service provider's capability in security and risk management.

2.4 Backup, Redundancy, and Disaster Recovery Infrastructure

- 2.4.1 The Contractor shall provide redundant infrastructure, including hardware, software, and network connection, as a system failover measure to ensure system stability and accessibility.
- 2.4.2 Planned maintenance shall be undertaken outside working hours or as agreed with the employer/client's representative. Full backup of system data shall be undertaken before conducting major system maintenance.
- 2.4.3 The DWSS servers shall always be accessible when internet connection is available. Users shall be able to access the system with internet browsers or Mobile APP to undertake daily operations without physical and geographical limitation.
- 2.4.4 The Contractor shall guarantee 99.9% system uptime during working hours of the Contract.
- 2.4.5 The Contractor shall propose a disaster recovery plan and provide the required infrastructure guaranteeing full system accessibility within 12 hours of major disaster in hosting site.
- 2.4.6 Backup scheme is required to protect the data loss of less than 24 hours. The Recovery Point Objective (RPO) shall not exceed 24 hours to ensure minimal data loss in the event of system failure or disaster.
- 2.4.7 The system time of the DWSS shall be synchronized among the DWSS backend servers and all mobile devices to a trusted local time source (e.g., the Hong Kong Observatory).

2.5 Mobile App Maintenance

- 2.5.1 The Contractor shall maintain the Mobile App to support the latest iOS or Android operating systems.

3. System Delivery and Project Team Requirements

3.1 System Delivery Schedule

- 3.1.1 Within one month from the commencement of the contract, the Contractor shall propose the DWSS and arrange a live demonstration for the employer/client's representative's approval.
- 3.1.2 The Contractor shall submit the DWSS proposal within eight weeks after the commencement of the contract or within a period as agreed with the employer/client's representative. The DWSS proposal shall include but not be limited to (i) Design of the forms, records, reports, and dashboards, (ii) Workflow processes and the allowable time for completing each action in the workflow, (iii) Interfacing protocols with the smart site data systems, (iv) Platform architecture (v) Network configuration, (vi) Hosting environment, (vii) Schedule of system delivery, (viii) User acceptance criteria, (ix) Backup and disaster recovery plan, and (x) Security assurance plan, etc.
- 3.1.3 The DWSS shall be commissioned within three months from the commencement of the works contract or within a period as agreed with the employer/client's representative.

3.2 Project Team Requirements for DWSS Management

- 3.2.1 The employer/client's representative shall appoint a project team member, at least at professional rank, to manage the DWSS and ensure proper operation and system integrity throughout the contract period.
- 3.2.2 The employer/client's representative shall also appoint a resident site staff (RSS), at least at professional rank, or if justified a RSS at inspectorate rank supported by the project team member mentioned in Section 3.2.1, to manage the DWSS and ensure proper operation and system integrity on-site during the works.
- 3.2.3 The appointed project team officer and RSS shall be responsible for: (i) Managing DWSS operations, (ii) Ensuring system integrity, (iii) Coordinating with system administrators, (iv) Monitoring system performance, (v) Facilitating user training and support, and (vi) Acting as liaison with the Contractor for system maintenance and upgrades, etc.

PART B: SECURITY, ACCESS CONTROL & COMMUNICATIONS

4. System Security, Backup, and Data Protection

4.1 General Security Requirements

- 4.1.1 Secure connection of at least 256-bit SSL shall be used for any network communication, transaction, and data feed.
- 4.1.2 All data stored on the DWSS shall be encrypted in transit and at rest.
- 4.1.3 The Contractor shall implement appropriate arrangements for preventing unauthorized access to the DWSS and its data.
- 4.1.4 The Contractor shall implement measures and conduct IT security audits to ensure the security of the DWSS in accordance with (i) Chapter IX of the Security Regulations, (ii) Core Security Principles of the Baseline IT Security Policy promulgated by the Digital Policy Office (DPO), (iii) Relevant parts of the derived employer/client's IT Security Policy that complies with the Security Regulations and the Baseline IT Security Policy.

4.2 System Backup and Data Protection

- 4.2.1 The DWSS shall perform scheduled incremental backup on a daily, weekly, and monthly interval automatically.
- 4.2.2 An off-site backup of full system data, including audit trails and system logs, shall be undertaken every month or at a frequency as agreed with the employer/client's representative to minimize the impact of system failure and any possible virus or ransomware attacks.
- 4.2.3 The Contractor shall keep at least three versions of backup of the DWSS for at least 12 months.
- 4.2.4 For site-hosted systems, backup copies shall be stored on at least two different media types, with at least one copy kept off-site or at locations agreed with the employer/client's representative.

- 4.2.5 The Contractor shall provide necessary infrastructure, including hardware, software, and backup media, to support the backup exercise.
- 4.2.6 The Contractor shall carry out system backup restoration test during acceptance test of the DWSS and every 12 months thereafter.
- 4.2.7 If the DWSS is a cloud-based Software as a Service (SaaS) application, the DWSS shall download and replicate a local copy of application data automatically to the site office server on a daily basis.

4.3 Logging, Monitoring, and Audit Trails

- 4.3.1 The DWSS shall maintain and keep audit trails and system logs for a minimum period of six months to record add, edit, and/or delete processes undertaken by users.
- 4.3.2 The Contractor's system administrator shall submit log records every three months for employer/client's representative's review to ensure system security and integrity.
- 4.3.3 The system administrator shall be able to specify how long audit logs will be kept. The minimum retention period shall be six months.
- 4.3.4 All email communications from the DWSS shall comply with data protection and confidentiality requirements specified in Section 4.1 and shall be logged for audit purposes.
- 4.3.5 Email attachments received via the dedicated system email address shall be (i) Scanned for viruses and malware, (ii) Validated against file type restrictions, (iii) Stored securely in the DWSS database or file server, and (iv) Linked to appropriate workflow records or documents as agreed with employer/client's representative.

5. User Authentication, Authorization, and Mobile Device Management

5.1 User Account Management

- 5.1.1 The employer/client's representative shall appoint and assign duties of system administrator(s) for the employer/client, the employer/client's representatives, contractors, or other parties as approved by the employer/client's representative to

manage and assign functional components/modules, access rights, and authorities, etc. to different staff in their organizations.

5.1.2 The DWSS shall provide a user management portal to facilitate system administrators to grant, change, and/or revoke user access rights and assign functional components/modules to users.

5.1.3 The DWSS shall allow the authorized system administrators to assign users to different user groups, manage and assign different access rights to different users or user groups, etc.

5.2 Login and Password Requirements

5.2.1 The DWSS shall issue login and password to users by email once their accounts have been set up. Users are required to change the default password at first login.

5.2.2 Each user shall be assigned a unique login ID in the system with a strong password with a mix of at least eight mixed-case alphabetic characters, numerals, and special characters.

5.2.3 The DWSS shall require users to change the password every three months or at a frequency as agreed with the employer/client's representative.

5.2.4 Users can reset their own password with their registered email and multiple factor authentications.

5.3 Two-Factor and Single-Factor Authentication

5.3.1 Two-factor authentication shall be adopted for users to log on to the DWSS. For example, (i) Login ID with strong password plus biometric authentication (facial or fingerprint recognition), or (ii) Other authentication methods during offline mode as agreed with employer/client's representative

5.3.2 Single-factor authentication shall be adopted for users to perform the functions of the DWSS (submission, acknowledgement, approval, and completion of assigned workflow, etc.). For example: (i) Strong password, (ii) Biometric authentication (facial

or fingerprint), or (iii) Other authentications as agreed with employer/client's representative.

5.3.3 User re-authentication is required prior to submission, acknowledgement, approval, and completion of assigned workflow activities.

5.3.4 The system shall incorporate re-authentication functions requiring users to re-authenticate after system idle periods as determined by the employer/client's representative.

5.4 Account Security and Deactivation

5.4.1 The DWSS shall temporarily suspend a user account after five invalid login attempts and keep all logs. Only authorized system administrators may unlock and configure user accounts.

5.4.2 The DWSS shall implement procedures for handling user accounts of resident site staff (RSS) and contractor's staff leaving projects, including immediate account deactivation and transfer of responsibilities.

5.5 Access Rights and Authorization

5.5.1 The system shall allow the system administrator to assign different access rights to each application and dashboard.

5.5.2 The DWSS shall manage user access right for authorized users or user groups from the employer/client, Consultants, Contractors, and/or any other parties, including sub-contractors and suppliers, as approved by the employer/client's representative.

5.5.3 Dashboards shall only be accessible by authorized users or user groups with designated authority. Different access rights should be assigned to each dashboard, area, or zone.

5.5.4 Reports and alerts of site activities shall only be accessible by authorized users or user groups with designated authorities.

5.6 Mobile Device Management (MDM)

5.6.1 Mobile Device Management (MDM) software or similar tool is required to distribute,

upgrade, manage, and wipe the DWSS applications, data, and configuration settings for all types of registered mobile devices used in the contract over-the-air.

5.6.2 The Contractor shall propose an MDM software or similar tool and the MDM policy and agree with the employer/client's representative within one month after acceptance of the proposed DWSS.

5.6.3 The Contractor shall set up and maintain MDM software or similar tool to ensure the system security and integrity of the registered mobile devices across multiple mobile operating systems.

5.6.4 The DWSS shall prevent all access from non-registered mobile devices.

5.7 Mobile App Functionality and Synchronization

5.7.1 The Mobile App shall be a native application capable of implementing/triggering the native library on mobile devices such as camera, GPS, messaging, alert, and notification directly.

5.7.2 Users shall be able to execute required actions, including but not limited to submission, approval, and operations, directly on the Mobile App. Captured data shall be automatically synchronized with the backend servers of the DWSS application systems (either physical server or cloud platform) whenever internet connection is available.

5.7.3 The DWSS shall be able to temporarily cache/store information and data on mobile devices at the time of inspection or completing records when internet connection is not available. All records in the temporary cache/storage shall be automatically synchronized to the backend servers once internet connection is available.

5.7.4 Notifications shall be issued to users from the Mobile App for assigned action items.

5.7.5 The Contractor shall maintain the Mobile App to support the latest iOS or Android operating systems.

6. System Communications and Email Integration

6.1 Dedicated System Email Address

6.1.1 The DWSS shall possess a dedicated system email address to provide a communication channel to users for the following purposes:

- i. Sending notifications, alerts, and reminders to users
- ii. Enabling users to submit documents, comments, and information via email
- iii. Providing acknowledgment of receipt and status updates
- iv. Supporting workflow notifications and action assignments across all components/modules

6.1.2 The dedicated system email address shall be configured and maintained by the Contractor and shall be clearly communicated to all users upon system deployment.

6.2 Email-Enabled Functionality

6.2.1 The DWSS shall integrate the dedicated system email address across all functional components/modules to ensure consistent communication with users regarding:

- i. Workflow submissions and approvals
- ii. Form and record status updates
- iii. Document review and comment notifications (SDM)
- iv. Smart site application alerts and warnings
- v. System maintenance and updates
- vi. Overdue action reminders

6.2.2 For communications with external parties, the dedicated system email address shall be capable of:

- i. Receiving document submissions and comments from users
- ii. Processing email replies for workflow acknowledgments
- iii. Accepting email attachments for document uploads
- iv. Supporting email-based comment submissions for external reviewers (SDM)

6.2.3 For submissions and actions received via email, the system shall send automatic acknowledgment emails confirming receipt and providing action status.

6.2.4 The SDM shall support external reviewers to submit comments by replying directly to reviewer invitation emails from the dedicated system email address, with automatic acknowledgment of receipt provided to reviewers.

PART C: CORE FUNCTIONAL COMPONENTS

7. Workflow Management

7.1 General Workflow Principles and Capabilities

- 7.1.1 Workflows are sequential electronic processes to circulate forms or records automatically to designated users or groups of users.
- 7.1.2 The DWSS shall be able to digitize site operation and contract management workflows and capture approval history, inspection records, and site records as required under the contract.
- 7.1.3 The DWSS shall be able to issue notifications to designated users according to the workflow assignment.
- 7.1.4 The DWSS shall provide interfaces for the system administrator to edit the workflow when necessary.
- 7.1.5 The DWSS shall be able to maintain all records and their relationships created in previous workflow processes when changes to the workflow are made afterwards. Users shall be able to retrieve all records in the DWSS according to the hierarchy and relationships created from workflow processes.

7.2 Data Capture and Storage

- 7.2.1 The DWSS shall be able to capture different types of module-specific data, including text, numbers, date and time, locations, identification of users, checkbox, URLs, files, and images in workflow-enabled forms.
- 7.2.2 All captured data shall be kept in a database management system in the form of textual, numerical, date & time, and locations format to support direct indexing, searching, filtering, reporting, and exporting purposes.
- 7.2.3 Forms shall be set up with selection lists and checkboxes as far as practicable and minimize the use of non-standardized "free-text" fields to support filtering and statistical analysis.

7.2.4 All captured data and workflow process in the DWSS shall be extractable by Application Programming Interfaces (API) or Web Services.

7.3 Form and Record Management

7.3.1 The DWSS shall manage predefined forms for users to undertake daily operations on-site and in office.

7.3.2 A unique identifier shall be stamped to all forms and records as an attribute in the DWSS database.

7.3.3 The unique identifier shall be a 6-digit serial number with one character for the revision/resubmission number, which shall be automatically generated by the DWSS.

7.3.4 The filing system for the DWSS forms and records shall follow the format:

Module/Type of Form/Serial Number/Revision

Example: RISC/SUR/000001A

Field 1 – Application Type (up to 4 characters):

RISC: Site Inspection/Survey Request Form

SD: Site Diary

SRB: Site Record Book

SSR: Site Safety Record

CIC: Daily and Weekly Cleansing Inspection Checklist

LRR: Labour Return Record

CM: Contract Management

Field 2 – Application Form Sub-Type (up to 4 characters):

SUR: Survey

SI: Site Inspection

PW: Pre-Work Safety Check

WSI: Weekly Safety Walk Inspection

MSI: Monthly Safety Walk Inspection

EI: Environmental Inspection

PTW: Permit to Work

NCR: Non-Conformity Reports

SPP: Safety Performance Report
SCR: Safety Score Card
DCI: Daily Cleansing Inspection
WCI: Weekly Cleansing Inspection
PMI: Project Manager's Instruction
CE: Compensation Event
EW: Early Warning
IP: Interim Payment
XX: Not Applicable

Field 3 – Serial Number: 6-digit serial number automatically generated by DWSS (000000–999999)

Field 4 – Revision/Resubmission: 1 character for revision/resubmission (A–Z)

- 7.3.5 The DWSS shall assign a unique identifier automatically and sequentially for each form and record at the time of generation. The DWSS shall allow authorized system administrators to correct mistakenly assigned numbers and file reference numbers. A function shall be provided to backward the status in the creation of folio number operation.
- 7.3.6 The DWSS shall allow users to create drafts using Mobile App or web-browsers and store as temporary records in backend servers. Users shall be able to edit temporary records before submission, review, or approval.
- 7.3.7 Submitted, reviewed, or approved forms or records shall be stored and locked permanently. Changes to these records are not allowed by unauthorized users. Changes can only be made through rejection and resubmission of workflows which supersede the previous records.
- 7.3.8 Each submission and approval shall be time-stamped with the associated issuers or approvers.

7.4 Workflow Submission, Approval, and Photograph Management

- 7.4.1 Workflows are triggered by assigning forms to next approval or reviewing party.
- 7.4.2 Users cannot edit forms after submission.

- 7.4.3 The Contractor shall agree with the employer/client's representative on the criteria, workflow, and procedures for checking and detecting irregularities in generating alert notifications by means of emails or push notifications to designated users for overdue actions, poor performance, and irregularities, etc. Artificial intelligence (AI) may be applied within the DWSS to assist in these checks as appropriate.
- 7.4.4 The Contractor shall agree with the employer/client's representative on the workflow, format, and data field of all required forms within six weeks after contract commencement and set up all workflow-enabled inspection forms or records with reference to CEDD PAH, ArchSD PAH, ArchSD SAH, and the contract documents within three months after contract commencement.
- 7.4.5 The DWSS shall enable the creation of forms and subsequent submission, reception, approval, rejection, and response to the request to be done in the Mobile App and web-browser.
- 7.4.6 The DWSS shall record the user assignment track and time stamp along the inspection workflow to support process time analysis for each type of inspection.
- 7.4.7 The Mobile App shall be able to capture images directly from cameras of mobile devices, and photos shall be appended to forms or records directly. Only photos captured by the same device can be used for inserting into DWSS forms and records.
- 7.4.8 Resolutions of photographs shall be optimized, compressed, and resized automatically before uploading to DWSS backend server. The maximum file size of each uploaded photograph shall be less than 1MB or as agreed with the employer/client's representative.
- 7.4.9 The date, time, and GPS location of photographs shall be captured/extracted from mobile devices and stored as metadata of photographs or attribute fields of associated forms or records. GPS locations shall be exportable to HK80 coordinates system.

7.5 Mandatory Modules: Forms and Records

- 7.5.1 The DWSS shall incorporate six mandatory modules. Detailed functional requirements for each module are specified below:

i. Request for Inspection/Survey Check (RISC) Form

- a. **Form Reference:** RISC Form refers to Appendix 7.82A [GCC] and Appendix 7.82B [NEC] per PAH 2024, "Request for Inspection of Works" Form No. D/COW.006 for COW and Form No. D/BSI.006 for BSI in ArchSD PAH or other relevant form for the same purpose.
- b. **Inspection Plan Alignment:** The submission and approval of the RISC Form shall also follow the approved Inspection and Test Plan of the relevant works activities.
- c. **Form Workflow:** Forms created for the RISC Forms workflows shall enable the requesting officer to submit and re-submit inspection requests until the inspection is certified completed.
- d. **Linkage and History:** The workflow-enabled forms shall ensure the linkage of inspection history and re-submissions are recorded for searching and retrieval.
- e. **Documentation:** Photo records shall be included in the forms.
- f. **Inspection Status Dashboard:** The summary of RISC form status shall include analytical summary and status of: (i) overdue actions, (ii) completed/incomplete/outstanding inspections, (iii) passing/failing rate, and (iv) process time analytics, etc.

ii. Site Diary/Site Record Book

- a. **Form Reference:** Site Diary refers to G.F. 536 and Site Record Book refers to ArchSD Site Record Book.
- b. **Workflow Process:** Forms created for the Site Diary/Site Record Book shall include workflow process for recording, review, and endorsement.
- c. **Record Content:** Forms shall be set up to record: (i) Progress of work, (ii) Plant and labour employed on site, (iii) Weather and site conditions, (iv) Site photos, and (v) Any occurrence which affects the progress and/or quality of works and the extent to which they are affected.

- d. **Documentation:** Photo records shall be included in forms.
- e. **Statistics:** The site diary statistics shall include analytical summary and status of: (i) overdue actions, (ii) completed/incomplete/outstanding Site Diary/Site Record Book, (iii) Labour and plant deployment, (iv) Weather conditions, and (v) Instructions issued to Contractor, etc.

iii. **Site Safety Inspection Records**

- a. **Scope:** Site Safety Records shall include:
 - (i) Safety inspection checklists to record inspection results and associated photographs of weekly and monthly safety walk inspections and environmental inspections with reference to Chapter 8 of Construction Site Safety Manual; and
 - (ii) Safety performance records to record accident rate statistics, LD/MD improvement and suspension notices, conviction records, and other relevant information with reference to the proforma for Contractor's Monthly Report on Safety Performance in Chapter 12 of Construction Safety Manual.
- b. **Workflow Process:** Forms created for Site Safety Records shall include workflow process for submission, review, confirmation, and completion of safety inspections.
- c. **Record Content:** Forms shall be set up to record: (i) Date, time, name of reporting officers and responsible persons, (ii) Work location, (iii) Descriptions of works, (iv) Site photos before and after inspection, (v) Logging of non-compliance and remedial works, and (vi) Maintaining relationships of entire inspection and non-compliance report cycle.
- d. **Statistics:** The site safety statistics shall include analytical summary and status of: (i) overdue actions, (ii) completed/incomplete/outstanding site safety inspections, (iii) non-compliance reports, (iv) observation reports, (v) near-miss reports, (vi) accident rate, (vii) incident reports, (viii) safety convictions, and (ix) number of unsafe acts and unsafe conditions identified

at each inspection, etc.

iv. Cleansing Inspection Checklists

- a. **Scope:** Site Cleanliness Records shall include (i) Daily Cleansing Inspection Checklist, (ii) Weekly Cleansing Inspection Checklist, and (iii) Cleanliness Performance Record to record works undertaken to maintain site cleanliness and tidiness and contractor's performance with reference to ETWB TC(W) No. 22/2003 & 22/2003A.
- b. **Documentation Requirements:** Daily and weekly inspection checklists and photographs taken at various work locations shall be recorded for monitoring of site cleanliness condition.
- c. **Workflow Process:** Forms created for Site Cleanliness Records shall include workflow process for submission, review, confirmation, and completion of cleansing inspections.
- d. **Record Content:** Forms shall be set up to record: (i) Date, time, name of reporting officers and responsible persons, (ii) Work location, (iii) Descriptions of works, (iv) Record photos before and after inspection, (v) Logging of non-compliance and remedial works, and (vi) Maintaining relationships of entire inspection and non-compliance report cycle.
- e. **Statistics:** The site cleanliness statistics shall include analytical summary and status of: (i) Completed/incomplete/outstanding site cleanliness inspections, (ii) Non-compliance reports, and (iii) Number of offences, non-compliance, and remedial works.

v. Labour Return Record

- a. **Form Reference:** Labour Return Records refers to G.F. 527 under DEVB Technical Circular (Works) No. 3/2003A – Monthly Return of Site Labour Deployment and Wage Rates for Construction Works.
- b. **Data Fields:** Forms shall include all data fields listed in the active G.F. 527.
- c. **Automatic Calculation:** Forms shall automatically generate/calculate

project-specific fields and dates and avoid repeated entry of similar fields.

- d. **Data Integration:** Forms shall be set up to allow automatic retrieval of labour resources information from Site Diary/Site Record Book.
- e. **Workflow Processes:** The workflow process shall include manual input, submission, acknowledgement, and responding to enquiry on Labour Return Record.
- f. **Statistics:** The labour return statistic shall include analytical summary and status of: (i) number of labour deployed and (ii) wage rates of workers, etc.

vi. Contract Management

- a. **Scope:** Contract Management shall include workflow processes such as Compensation Event, Project Manager's Instruction, Early Warning, programme and payment, etc. as stipulated in the respective contract documents and the corresponding contract forms such as New Engineering Contract (NEC).
- b. **Payment Workflow:** For payment, the workflow stipulated in the corresponding Payment Certificate shall be incorporated in the DWSS.
- c. **Workflow Processes:** Forms shall enable workflow processes for contract management including:

(i) Compensation Event / Project Manager's Instruction / Early Warning:

- 1. Title and reference number
- 2. Description
- 3. Justification
- 4. Dates (submission/response/implementation/closing dates)
- 5. Details of cost and time implication
- 6. Relevant supporting documents

(ii) Payment:

- 1. Financial data contained in Payment Certificates
- 2. Interim assessment of Contractor's share (NEC Option C and D)

3. Relevant supporting documents

(iii) **Programme:**

1. Contract Key Dates and Completion Dates
2. Planned Key Dates and Completion Dates
3. Relevant supporting documents

- d. **Key Contract Information:** The Contract Management module shall contain and automatically update the following key contract information through workflow processes:

- (i) Contract Number, Title, and Scope
- (ii) Key Financial Data (such as Approved Contract Sum, current and estimated final Price for Work Done to Date, Total of the Prices, Fee Percentage, etc.)
- (iii) Key Contract Dates (such as Commencement Dates, contract and planned Key Dates and Completion Dates)
- (iv) NEC Health Check Data

- e. **Statistics:** The contract management statistics shall include analytical summary and status of: (i) Compensation Events, (ii) Project Manager's Instructions, (iii) Early Warnings, (iv) Updated financial status, (v) Completion Dates, (vi) NEC Health Check data, etc.

8. Smart Construction Management

8.1 Smart Construction Applications and Integration

8.1.1 The project team is encouraged to deploy smart construction applications for site monitoring on progress, safety, deformation, material, machinery, and environment with utilization of technologies such as AI applications, IoT remote sensors, smart carry-on devices, and drones.

8.1.2 The DWSS shall incorporate Smart Construction Management as the data hub to collect and consolidate data from the smart construction applications deployed on site and provide real-time alerts and warnings to responsible officers for follow-up actions through Application Programming Interfaces (API) and/or real-time communication protocols. Alerts and warnings shall be communicated via the dedicated system email address (Section 6) and/or push notifications to the Mobile App.

8.1.3 Key metrics associated with smart construction applications shall be presented in the form of dashboards to facilitate continuous site monitoring and formulation of enhancement/preventive measures.

8.2 Smart Construction Application Examples and Data Management

8.2.1 The following are examples of smart construction applications that may be deployed:

- i. **Progress Monitoring** – Land-based and drone-based photogrammetry
- ii. **Safety Monitoring** – Detection by AI cameras and wearable devices on (a) intrusion of dangerous/restricted zones and (b) misbehaviors of workers on-site, and other smart site safety devices as required under Smart Site Safety System (SSSS)
- iii. **Deformation Monitoring** – Remote sensors to monitor settlement, tilting, movement, vibration, etc. of concerned features
- iv. **Material Monitoring** – Sensors for measuring early-age concrete strength by maturity method
- v. **Machinery Monitoring** – AI cameras and IoT sensors to monitor utilization rates, unauthorized uses, and malfunctions of machinery
- vi. **Environmental Monitoring** – Remote sensors to measure environmental data such as air quality, noise level, water quality, etc.

8.2.2 The smart construction information shall include photographs, short videos, date and time, locations, type and frequency, relevant parties, and description of events to support generation of the site information dashboard.

8.2.3 Smart construction information shall be kept in a database management system in the form of textual, numerical, date & time, and locations format to support direct indexing, searching, filtering, reporting, and exporting purposes.

8.2.4 Multimedia data (such as short videos and photographs) shall be stored in a file store system and linked to the database management system with its storage path and metadata (such as location, date & time, and description) to support direct indexing, searching, filtering, reporting, and exporting purposes.

8.2.5 Textural data stored in database fields shall be in English, unless under further instruction by the employer/client's representative.

8.3 Smart Construction Data Dashboard

- 8.3.1 The dashboards shall enable grouping and filtering by types of forms, smart construction applications, selected period, trade, location, area, users, or user groups, etc.
- 8.3.2 The smart construction application statistic shall include key metrics of smart construction applications such as:
- i. Numbers and key details of unauthorized entries of restricted zones;
 - ii. Exceedance of Alert-Alarm-Action levels of deformation monitoring points deployed on sites; and
 - iii. Other relevant metrics as agreed with the employer/client's representative
- 8.3.3 The DWSS may store the key information (such as date, time, location, number and descriptions or alert messages) during the occurrence of an event and present them in the dashboards. The dashboards may also enable the users to visualise charts, and retrieve photographs and/or video streams of historical events of the smart site applications.

9. Smart Document Management

9.1 Purpose and Scope

- 9.1.1 The Smart Document Management (SDM) is a workflow-enabled system component to facilitate electronic processing, storage, organization, and management of all formal project documentation including incoming/outgoing correspondence, submissions, drawings, specifications, and reports, distinct from the operational workflow forms covered in Section 7.
- 9.1.2 The SDM shall manage workflow processes for all types of site documents including formal correspondence, design submissions, consultant approvals, construction permits, and project records.
- 9.1.3 The SDM shall enable registration, digitization, submission, reception, approval, rejection, and response to workflows via web browsers. Version of and changes in documents are tracked.

- 9.1.4 The SDM shall centralize all site documents on a core database to facilitate input, collection, storage, retrieval, display, distribution, and reuse of all site documents.
- 9.1.5 For physical incoming correspondence, documents shall be scanned into softcopy either in a standard image format or in the format according to its native application and stored in portable document format (.pdf).
- 9.1.6 Documents stored in SDM shall be retrievable instantaneously through networked computers at designated locations within and outside the employer/client's representative's accommodation with sufficient security measures to protect information flow.
- 9.1.7 The system shall enable users to share documents with colleagues quickly.
- 9.1.8 The SDM should be designed to enable integration or data transfer to the employer/client's departmental document management systems. The system design shall conform to departmental standards to facilitate data integration.

9.2 Data Management, Classification, and Document Organization

- 9.2.1 All data and files shall be separated from software and programs to enable retrieval by other applications of the Development Bureau (e.g. iCWP).
- 9.2.2 The database design shall enable further integration of data if necessary.
- 9.2.3 The SDM shall store all captured data in database in form of textural, numerical, date, and time or other formats to support direct indexing, searching, filtering, and reporting purposes.
- 9.2.4 The SDM shall build multiple layers of relationship and linkage between submissions and their associated documents, image files, and drawings. Incoming correspondence may be related by 'Reply to/by' relationships with outgoing correspondences in many-to-many relationships. The SDM shall support multi-dimensional organizational structures.
- 9.2.5 All documents shall be automatically or manually tagged with relevant metadata including: (i) Document type and category, (ii) Creation date and time, (iii) Related

components/modules, (iv) Associated personnel, (v) Location information, and (vii) Workflow status

9.3 Unique Identifiers and File Reference System

- 9.3.1 The SDM shall automatically and sequentially assign a unique identifier to each form or record at the time of its creation.
- 9.3.2 The SDM shall allow the System Administrator to correct mistakenly assigned numbers and file reference numbers. The SDM must provide a function to revert the status during the creation of folio numbers.
- 9.3.3 File Reference Numbers shall be pre-defined based on WBTC No. 19/93 and easily customized in hierarchical order. A File Reference Number may be generated based on organizational structures such as Division, Department, Project/Contract Number, File Type, and File Number, etc.
- 9.3.4 The SDM shall provide logical components (e.g., cabinets, drawers, folders) to establish and design such organization structure with reference to WBTC No. 19/93.
- 9.3.5 The folio number value shall be automatically assigned by the system with at least support for 5-digit length (e.g., from 00000 to 99999) and the reference number shall be concatenated from identifiers separated by delimiters (/):

Project Identifier / Contract Number / File Division / File Number / File Number Extension / Folio No.

Example: R9K/2003/09/M30/200/12/00001

Notes:

R9K = Project Identifier
2003/09 = Contract Number
M30 = File Division
200 = File Number
12 = File Number Extension
00001 = Folio Number (automatically assigned)

- 9.3.6 The SDM shall allow specified users to correct mistakenly assigned folio numbers and

file reference numbers. A function shall be provided to revert the status during folio number creation.

- 9.3.7 The SDM shall provide an interface that can manipulate the data of site diary and other site records as specified in the Project Administration Handbook currently in use in Government Projects.
- 9.3.8 The SDM should provide a clear structured tree diagram for users to navigate the project hierarchy and retrieve project documents by Contract Number, File Number, File Division, File Extension, etc., then document record and attachment. This shall be agreed by the employer/client's representative during system development. Each level of tree diagram should be capable of expanding and hiding by users.
- 9.3.9 User should be able to create/edit document records, create/edit document relationships, and retrieve action history of specific project documents or undertake other document-related manipulation functions under web browser.

9.4 Document Manipulation and Intelligent Processing

- 9.4.1 The SDM shall provide a tool to view and print the physical file or searched file without editing the file.
- 9.4.2 The SDM shall provide a freezing function for documents such that there is no unauthorized modification.
- 9.4.3 The SDM shall be operated with a web browser, an Acrobat Reader, Picture Viewer, and a text editor for manipulating different electronic document formats essentially Word (.doc), Acrobat (.pdf), and TIFF.
- 9.4.4 All files in the SDM shall be time-stamped.
- 9.4.5 The SDM shall incorporate Optical Character Recognition (OCR) functionality or advance technologies, such as AI, to: (i) Extract text from scanned documents and images, (ii) Automatically populate metadata based on document content, (iii) Enable full-text search within scanned documents, and (v) Convert image-based PDFs to searchable formats.
- 9.4.6 The SDM shall support bulk document operations including: (i) Batch upload with

automatic metadata extraction, (ii) Bulk document reclassification, (iii) Mass document export for specific date ranges or categories, and (iv) Automated document naming based on predefined rules

9.5 Site Photo Management and Location-Based Retrieval

9.5.1 The SDM shall be able to handle registration of Site Photos.

9.5.2 A map / building viewing interface should be provided for users to indicate easily the location of photos taken.

9.5.3 The map viewing interface should provide navigation functions such that users can easily zoom in/out or fit the site map to the map viewing area.

9.5.4 A unique naming convention will be automatically assigned to uploaded site photos that enables users to retrieve the date, location, file number, and photographer easily from the name of the uploaded site photos.

9.5.5 The map / building viewing interface is available not only for site photo registration but also for viewing uploaded site photos through the web browser. Users can view site photos from different registrations by specifying the location from the map / building viewing interface by simple mouse click through web browser.

9.5.6 All registered site photos should be divided into appropriate location hierarchy that, other than locating by map / building viewing interface, provides another means for users to retrieve site photos easily.

9.6 Workflow, Action Assignment, and Communication

9.6.1 The SDM shall enable users to register documents through the completion of a document profile and distribute the registered document.

9.6.2 The fields of the document profile shall be user-definable.

9.6.3 The SDM shall provide a function for assignment of action which allows users to instruct distribution by specifying: (i) Action group/staff (Multiple is allowed), (ii) Action/Information by whom (Multiple is allowed), (iii) Document section (full/part of copy, i.e., partial document distribution), (iv) Remark/Message, (v) Due Date, and (vi)

Assign and Re-assign action to user (Multiple is allowed).

- 9.6.4 The SDM shall provide a user interface which allows action responsible staff to retrieve and deal with the document through the system.
- 9.6.5 Users with assigned action shall be able to reply to the action assigner or communicate through the system with other users. Users shall be able to reply to actions more than one time.
- 9.6.6 The SDM shall provide a function so that a user can send action messages to any user in the system, including himself/herself. Action messages may or may not reference any other documents, messages, and records in the system. Users shall receive notifications of action messages via the dedicated system email address (Section 6) or push notifications to the Mobile App.
- 9.6.7 Status of each action message shall be tracked by the system such as whether it has been acknowledged by the recipient and completed by the recipient.
- 9.6.8 The SDM shall enable all users to click on any subordinates to retrieve details of action assignment, including the progress of action taken. Related documents shall be displayed during this checking process.
- 9.6.9 The SDM shall allow action responsible staff to attach messages to documents as annotations and descriptions of action taken. Responses shall be more than one time.
- 9.6.10 The SDM shall facilitate action responsible staff to assign actions to other staff with remarks/messages, including recursive assignment of actions.
- 9.6.11 All documents described in this section shall be able to hyperlink to the physical file for display, including an optional operation for displaying all associated files in a tree format.
- 9.6.12 All assignment history and communication dialogue associated with a document shall be easily viewed by all users.

9.7 Email Processing and External Reviewer Submission Review

- 9.7.1 The SDM shall integrate with the dedicated system email address (specified in Section

6) to facilitate the following functions:

- i. **Process Received Emails** – Integrate incoming emails directly into the SDM for streamlined processing and response
- ii. **Collect Comments and Attachments** – Extract and compile comments and attachments from received emails for review and action
- iii. **Maintain Email Records** – Archive all relevant email communications to ensure a comprehensive record for auditing and reference purposes
- iv. **Send Email Notifications** – Utilize the system email to dispatch notifications, including late reminders and acknowledgments of receipt, enhancing communication and accountability

9.7.2 This section applies to submissions provided to external parties (non-employer/client's representative and non-Contractor) for review, comment, or approval.

9.7.3 The SDM shall invite and notify assigned Reviewers to engage in submission reviews via email from the dedicated system email address (Section 6). The reviewer invitation email should contain a hyperlink for Reviewers to access and download the assigned submission.

9.7.4 For avoidance of doubt, access to the submission through the hyperlink shall be granted only after the user has been authenticated by the SDM. The hyperlink shall not be used for user authentication or to bypass any user authentication process.

9.7.5 A sample of the reviewer invitation email is provided in Clause A1.1 of this Annex.

9.7.6 The SDM shall provide user-friendly, intuitive, and interactive user interfaces / portals (dashboards, forms, or tables) for Reviewers to submit their comments on assigned submissions to the Contractor.

9.7.7 The user interface shall be as simple and neat as possible. For example, only three buttons of "Download", "Comment," and "Assign" are shown on the main page of the SDM portal as shown in Clause A1.2 of this Annex.

9.7.8 The SDM shall accept comments on assigned submissions from Reviewers submitted through email clients (e.g., Outlook, HCL Notes) by replying directly to the reviewer invitation email.

- 9.7.9 For Reviewers who submit comments on SDM portal, the SDM shall send an email acknowledgment from the dedicated system email address (Section 6) of comments with a copy of the captured comments to the Reviewer for record. A sample of the email acknowledgment of comments is provided in Clause A1.3 of this Annex.
- 9.7.10 The SDM shall allow Reviewers to submit comments on assigned submissions after the due date and continuing until a new revision of the assigned submission is provided by the Contractor.
- 9.7.11 The SDM shall allow Reviewers to provide comments in form of digital files (CAD drawings, Word documents) via email attachments and directly through the SDM portal.
- 9.7.12 The system shall support upload capacities of no less than 1024 megabytes per file through the SDM portal and shall allow a cumulative attachment size of no less than 20 megabytes per email.
- 9.7.13 The Contractor shall ensure adequate data storage on the SDM to enable uninterrupted and efficient uploads of comment files. This obligation includes continuous monitoring and regular evaluation of the SDM's storage capacity to preclude service interruptions and mitigate disputes.
- 9.7.14 The SDM shall allow Reviewers to access and read their own previously submitted comments on all submissions assigned to them under the contract.
- 9.7.15 The SDM shall allow Reviewers to selectively hide their comments from other reviewers, facilitating more focused discussions on specific topics among designated groups or individuals.
- 9.7.16 The SDM shall provide user-friendly and intuitive user interfaces / portals (dashboards, forms, or tables) for Reviewers acting as Review Assignors to invite and assign additional Reviewers to collaboratively comment on their assigned submissions.
- 9.7.17 The SDM shall allow Review Assignors to include supplementary text messages, such as instructions or remarks, within the invitation emails sent to additional Reviewers.
- 9.7.18 The SDM shall provide user-friendly, intuitive, and interactive user interfaces / portals (dashboards, forms, or tables) for Review Assignors or authorized coordinators to manage, consolidate, and submit comments from additional Reviewers they have

assigned.

9.7.19 Comments from additional Reviewers shall not be revealed directly to the Contractor. Instead, comments must be consolidated and approved by Review Assignors or authorized coordinators before being submitted and revealed to the Contractor.

9.7.20 The SDM shall provide user-friendly and intuitive user interfaces / portals (message boxes) for the Contractor to response comments from Reviewers to streamline the response process.

9.7.21 The key SDM functional requirements for the submission review processes are outlined in the table below. Arrangements should be discussed and agreed with the employer/client's representative:

Key Items	Functional Requirements
Authentication method for Reviewers to log in to the SDM	Single-factor authentication (SFA) – One-Time Password (OTP) via email from the dedicated system email address
Access rights for Reviewer to operate within the SDM	(a) Access only to assigned submission(s); (b) Download and comment assigned submission(s); and (c) Invite and assign additional and relevant Reviewers to provide comments for their assigned submissions
Methods for Reviewer to submit comments on submission(s)	(a) Reply to reviewer invitation email; and (b) Enter directly in the SDM (e.g., through web browsers)
User interface design for Reviewers to operate within the SDM	(a) Simple, neat, modern, and intuitive design is recommended; (b) Only essential information should be displayed and required for input

9.8 Workflow Design, Document Security, and Version Control

9.8.1 The Contractor shall prepare and submit a comprehensive report outlining details of the proposed workflows, data formats, and data fields of all required records within six weeks from the Starting Date of the Contract for acceptance by the employer/client's representative.

9.8.2 The SDM shall be capable of registering and digitizing all workflows and actions,

capturing the submission and approval history of records for all workflows as required under the contract.

- 9.8.3 The SDM shall enable creation of forms and subsequent submission, reception, approval, rejection, and response to requests via web browsers.
- 9.8.4 The SDM shall record and log every event (user assignment, timestamps) along the delivery workflow to support delivery process time analysis.
- 9.8.5 The SDM shall be capable of issuing notifications to designated users according to the workflow assignment via email (using the dedicated system email address in Section 6) or push notifications to the Mobile App.
- 9.8.6 The SDM shall provide interfaces for System Administrators to edit workflows when necessary.
- 9.8.7 The SDM shall maintain all records and their relationships created in previous workflow processes when changes to the workflow are made. Users shall be able to retrieve all records in the SDM according to the hierarchy and relationships created from workflow processes.
- 9.8.8 The Contractor shall prepare and submit a comprehensive report outlining the criteria and workflows for generating alert notifications via email (using the dedicated system email address in Section 6) or push notifications to designated users for overdue actions and poor performance, etc., for acceptance by the employer/client's representative.
- 9.8.9 The SDM shall maintain complete version history for all documents, tracking: (i) All modifications with timestamps, (ii) User identification for each change, (iii) Reasons for modification where applicable, and (iv) Ensuring previous versions remain accessible for reference.
- 9.8.10 Documents shall be protected from unauthorized modifications through access controls aligned to user roles and permissions defined in the DWSS (refer to Section 5 for user access management).
- 9.8.11 The SDM shall prevent deletion of documents while allowing authorized users to archive documents according to retention policies (refer to Section 10.4).

9.9 Cross-Component/Module Integration and Collaboration Features

- 9.9.1 The SDM shall link related documents across different DWSS components/modules, such as Section 7 and 8, based on: (i) Workflow relationships, (ii) Temporal associations, and (iii) Content relevance
- 9.9.2 When accessing any workflow record from Section 7 or 8 components/modules, the SDM shall provide appropriate access to related documents including: (i) Associated drawings and specifications, (ii) Related inspection records, (iii) Linked correspondence and approvals, and (iv) Historical versions and revisions
- 9.9.3 The SDM shall maintain complete audit trails of document relationships and provide visualization of document linkages across components/modules.
- 9.9.4 The Smart Document Management shall provide collaboration tools including: (i) Document annotation and commenting capabilities, (ii) Document sharing with time-limited access links, (iii) Collaborative review workflows with tracked changes, and (iv) Integration with notification systems (email via dedicated system email address and Mobile App push notifications) for document updates.

10. Data Management, Search, and Reporting

10.1 Search Functionality and Reporting Capabilities

- 10.1.1 The DWSS shall provide search functions for records with: (i) File or form numbers, (ii) Keywords, (iii) Issuance and inspection/response dates, (iv) Tags, (v) Versions, (vi) Drawing numbers (SDM), (vii) Locations, (viii) Area, (ix) Trades, (x) Users, and (xi) Other relevant data.
- 10.1.2 The SDM shall provide unified search capabilities across all documents stored in the SDM, supporting: (i) Full-text search within documents (including scanned documents through OCR-extracted text or AI-extracted text), (ii) Metadata-based search, (iii) Advanced filtering by multiple criteria, (iv) Searches within specific components/modules or across the entire system, and (v) Wildcard character and symbol from Character Map usage
- 10.1.3 The DWSS shall support the searching of relevant records in the workflow.

10.1.4 Search results shall be displayed with relevance ranking and shall allow direct access to source records and related documents.

10.2 Dashboard and Reporting

10.2.1 Dashboards provide near real-time status of workflow processes, daily summaries, and periodic statistics of collected data at workflow checkpoints. Dashboards shall also include real-time status of key data and alerts from smart site applications.

10.2.2 Dashboards shall only be accessible by authorized users or user groups with designated authority. Different access rights should be assigned to each dashboard, area or zone.

10.2.3 The DWSS shall provide dashboard page(s) for all input data including usage statistics of all mandatory workflows, with content including: (i) Submission and approvals, (ii) Defects summary, (iii) Register summary of RISC forms, (iv) Site resources statistics, (v) Late submission analysis, and (vi) Process summary in charts, graphical, and/or tabular format.

10.2.4 For Workflow Management, the detailed requirements of dashboards for each module are specified in Section 7.5 (Mandatory Modules: Forms and Records).

10.2.5 The dashboard shall be designed to suit the need of respective contracts and include near real-time status and periodic statistics of site activities and contract management, including but not limited to: (i) summary of RISC form status, (ii) site activities statistics, (iii) site safety performance, (iv) site cleanliness performance, (v) labour return statistic, (vi) contract management statistic, (vii) smart site application statistic, and (viii) alert and reminder statistics, etc.

10.2.6 The Contractor shall agree with the employer/client's representative on the content and presentation of dashboard page(s) within three months after contract commencement.

10.2.7 All DWSS dashboards shall enable users to group, and filter displayed data by: (i) Types of forms and records, (ii) Smart construction applications, (iii) Selected time period, (iv) Trade and work activity type, (v) Geographic location, area, or zone designation, (vi) Associated users or user groups, (vii) Severity level or alert status (for alerts and reminders), and (viii) Other contract-specific criteria as agreed with the employer/client's representative.

10.2.8 The system shall apply grouping and filtering consistently across all dashboard views while maintaining real-time data updates where applicable.

10.2.9 The DWSS shall (i) generate near real-time status reports, alerts, and warnings, (ii) display dashboard results on both Mobile App and web-browser without additional software, (iii) support search, filter, sort, and re-arrange functions in descending/ascending order, (iv) allow users to extract detailed information by selecting fields, and (v) be downloadable in form of PDF, tabular (XLS, CSV), or other agreed formats.

10.2.10 The DWSS shall provide alert and reminder statistics, which should include summaries of alerts and reminders issued.

10.2.11 All reports shall be shown on the web browser and printable directly by the web browser.

10.3 Standard Reports, Export, and Document Retention

10.3.1 The DWSS shall allow authorized users to generate printable reports for: (i) Inspection forms and reports, (ii) Dashboards, and (iii) Other required documentation in PDF format.

10.3.2 Reports shall enable grouping and filtering by: (i) Selected period, (ii) Location, (iii) Trade, (iv) Creation/Submission/Inspection date/time, (v) Users and/or user groups, and (vi) Other agreed criteria.

10.3.3 All reports shall be generated without installing any additional software.

10.3.4 The DWSS shall allow authorized users to generate printable reports of workflow progress including: (i) Process time, (ii) Dead-locked processes, (iii) Assignment tracks, and (iv) Other metrics grouped and filtered by selected criteria.

10.3.5 The DWSS shall support export of records into: (i) PDF format, (ii) Tabular formats (XLS, CSV), and (iii) Other formats as agreed with the employer/client's representative.

10.3.6 The output format shall be configurable in accordance with contract requirements or standard forms commonly used for construction works (e.g., G.F. 527 for Labour Return).

- 10.3.7 The DWSS shall generate alerts and reminders via emails (using the dedicated system email address in Section 6) and/or push notifications for events including: (i) Overdue/outstanding actions, (ii) Missing forms, (iii) Incomplete inspection tasks, (iv) Incomplete forms, (v) Incomplete workflow processes, (vi) Poor performance, and (vii) Other events as agreed with the employer/client's representative.
- 10.3.8 The DWSS shall send alerts and reminders to designated users by email and/or SMS as agreed with the employer/client's representative.
- 10.3.9 The SDM shall implement data retention in accordance with Government Records Management requirements. Documents shall be retained for the periods specified in the contract or as directed by the employer/client's representative.
- 10.3.10 The SDM shall provide archival functions to: (i) Transfer documents to archive storage based on retention rules, (ii) Maintain read-only access to archived documents, and (iii) Preserve document metadata and cross-components/module linkages.
- 10.3.11 Disposal of documents shall require authorization from the designated system administrator and shall be logged for audit purposes.

PART D: INTEGRATION, HANDOVER & DELIVERY

11. System Integration, Handover, and Training

11.1 System Integration and APIs

- 11.1.1 The DWSS shall provide API libraries for authorized parties to access required data of the DWSS.
- 11.1.2 The Contractor shall maintain all APIs during system upgrade or maintenance and keep copy of API library documents after launching the DWSS and major system upgrades.
- 11.1.3 The Contractor shall ensure that the DWSS can be integrated with the employer/client's departmental document management systems. The Contractor shall provide comprehensive documentation on data structures, APIs, and migration procedures to support departmental integration.

- 11.1.4 The Contractor is responsible for coordinating with government departments or government agents for the exchange of DWSS information with third-party applications upon request of the employer/client's representative.
- 11.1.5 The Contractor is responsible for arranging uploading of required data automatically to the dedicated server/location such as iCWP at a daily interval. The detailed requirements of data for each components/module shall refer to the Data Standardisation Report for DWSS, which is a living document to be updated regularly. The latest report shall be made available on the DEVB website. Data exchange shall follow the specifications and data formats defined in the latest Data Standardisation Report for DWSS.
- 11.1.6 Forms or records in the DWSS shall be designed to include fields to store interfacing IDs (such as Object ID/BIM ID/Location ID) for the purpose of interfacing with BIM models through Application Programming Interface (API). Upon request of the employer/client's representative, the DWSS shall provide API for the Common Data Environment or BIM software applications to retrieve forms or records in the DWSS through the interfacing IDs.

11.2 System Handover Requirements

- 11.2.1 Upon completion of the contract, the DWSS shall be handed over to the employer/client in the form of an offline and password-protected copy not later than one month after issuance of the maintenance certificate.
- 11.2.2 The DWSS databases (including interfacing IDs) should be exported into open-source database formats (such as SQLite). They should be handed over with the database catalogue document to describe the definition of database fields.
- 11.2.3 In addition to the database, the Contractor shall export each inspection/record as a single organized, tabular, and searchable PDF format and name it with its unique identifier number. Associated supporting records (such as photographs, reports, etc.) should be organized in folders named with unique identifier numbers.
- 11.2.4 These records shall be handed over with a document register spreadsheet that lists: (i) Unique identifier, (ii) Workflow module/type of record, (iii) Project number, (iv) Works/tasks description, (v) Association keywords, and (vi) Creation and completion dates.

11.2.5 The handover copy shall be self-contained and in the form of a password-protected extractable package which can be accessed without need of handover of the physical hardware provided in the operation stage.

11.2.6 The Contractor shall ensure that all information from the DWSS is transferred to the Employer/Client's departmental document management systems upon completion of the contract, if applicable.

11.3 Data Ownership, Intellectual Property, and Confidentiality

11.3.1 The DWSS shall be licensed under "HKSAR Government."

11.3.2 The Contractor shall secure, obtain, and maintain throughout the contract period all approvals, permits, or licences which may be required in connection with the use of the DWSS and bear all costs, charges, and expenses incurred in obtaining and maintaining the permits and licences.

11.3.3 All data in the DWSS shall become the property of the HKSAR Government.

11.3.4 The ownership and all intellectual property rights, including without limitation any patent, copyright, registered design or trademark, in all reports, plans, models, or other particulars or things prepared by the Contractor or received in the course of the Contract shall be vested in and belong to the employer/client.

11.3.5 The Contractor shall not use any documents, particulars, or things or disclose the contents thereof to any third person in any manner outside the course of the Contract without prior approval in writing of the employer/client.

11.3.6 The Contractor shall not infringe any intellectual property rights of any publications and shall indemnify and keep indemnified the employer/client against all actions, claims, losses, damages, and costs which may be sustained by the employer/client consequent upon any such infringement.

11.4 Training and Documentation

11.4.1 The Contractor shall deploy qualified trainers to provide system administrator training and user training for assigned personnel of: (i) The employer/client, (ii) The

employer/client's representatives, (iii) Contractors, and (iv) Other authorized parties.

11.4.2 The training courses shall cover all levels or grades available, and training schedule must be submitted for approval by the employer/client's representative.

11.4.3 System administrator training shall cover: (i) User management, (ii) Workflow management, (iii) MDM (or similar tools), (iv) System backup, and (v) Other relevant topics.

11.4.4 User training shall cover the operation and usage of: (i) Mobile App functionality, (ii) Web browser interface, (iii) Workflow processes, (iv) Form completion and submission, (v) Document management (SDM), (vi) Dashboard and reporting, and (vii) Other relevant topics as agreed with the employer/client's representative.

11.4.5 The Contractor shall provide user manuals and training manuals for: (i) System administrators and (ii) End users covering all components/modules.

11.4.6 The Contractor shall provide: (i) System manual, (ii) Documentation on API and Web Services, (iii) Entity-Relation Diagrams, and (iv) Data Dictionary/Database Catalogue.

A.1 Recommended Email Templates for the DWSS

The email templates provided in this section are samples only and are subjected to be customized to meet the specific needs of the project, as deemed necessary by the employer/client's representative.

A.1.1 Sample Email Templates for Reviewer Invitation

From	[DWSS's Dedicated Email Address]
To	[Reviewer's Email]
Subject	Request for Review of [Contract Number & Name] Deliverable
Message	Dear [Reviewer's Name], I am writing to request your expertise in reviewing a key deliverable for our [Contract Number & Name] contract. Your insights and comments would be invaluable to ensure the quality and effectiveness of our work. Deliverable Details: Title: [Deliverable Title] Description: [Brief description of the deliverable] Due Date for Comments: [Specify the deadline] To access the deliverable, please log in to our project portal using the following link: [Portal URL]. Once logged in, you can download the document from the [specific section or folder name] section. You can provide your feedback by (a) replying directly to this email or (b) entering your comments in the portal under the [specific section or folder name] section. If you encounter any issues accessing the portal or need additional information, please do not hesitate to contact us. Your feedback will play a crucial role in the success of this

	project, and we greatly appreciate your time and effort. Thank you in advance for your support. Best regards, [Name of Project Team/Manager] [Contact Information of Project Team/Manager] [Company/Organization of Project Team/Manager]
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A.1.2 Sample Email Templates for Reviewer Comments Acknowledgment

From	[DWSS's Dedicated Email Address]
To	[Reviewer's Email]
Subject	Acknowledgment of Comments for [Contract Number & Name] Deliverable
Message	Dear [Reviewer's Name], I am writing to confirm that we have received your comments on the [Deliverable Title] for our [Contract Number & Name] contract. We greatly appreciate the time and effort you have taken to review the deliverable and provide your valuable insights. Your feedback is instrumental in helping us enhance the quality and effectiveness of our work. We will carefully consider your comments and suggestions as we move forward. Should we require any further clarification, we will reach out to you. Once again, thank you for your support and contribution to the success of this project. Best regards, [Name of Project Team/Manager] [Contact Information of Project Team/Manager] [Company/Organization of Project Team/Manager]