MASTER THESIS

Guide for IPD adoption

Improvements required in the contractual and managerial process to increase productivity within construction projects

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Declaration of authorship

I declare that this thesis and the work presented in it are my own and it has been generated by me as the result of my own original research. I have acknowledged all main sources of help.

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Abstract

Our buildings have changed over the past four decades but our productivity remains the same. Construction projects connect variety of specialists with contrasting values and knowledge. Modern technologies and tools represented by Building Information Modelling (BIM) provide solid support for integration of professionals with different interests. However, flexible guidance to Integrated Project Delivery (IPD) adoption is lacking.

The attempt of IPD implementation is discovered within two current projects located in Prague. The Case Study presents tangible source for further analysis of business processes to illustrate the level of integration in the running projects. Once the flaws are detected and examined, the research reveals that the need for new managerial and contractual model is justified.

Firstly, project participants have to share the same goals and values in order to work as an integrated team. Establishing IPD principles among parties builds strong foundations for integration. The transformation from traditional contracting to IPD creates balanced governing structure and pursues role definition. Information loss is eliminated through creation of an integrated team with clear appointment of responsibilities. The research presents not only the suggestions on how to adopt IPD but also outlines the template for IPD contract considered as the critical outcome of the IPD initiation process.

Key words:
Integrated Project Delivery, Implementation Plan, Multi-party Agreement, Workflow Analysis, BIM

Abstrakt

Budovy, které stavíme, se za posledních několik desetiletí změnily v mnoha ohledech, nicméně produktivita práce zůstává stejná. Stavební projekty spojují řadu specialistů s rozlišnými hodnotami a znalostmi. Moderní technologie a nástroje v podobě Building Information Modelling (BIM) poskytují pevnou podporu pro integraci odborníků a představují inovaci nejen v procesu navrhování. Nicméně, flexibilní manuál pro zavedení integrovaného řízení projektů (IPD) chybí.

Pokus o stmelení tradičního trojúhelníku Architekt – Generální dodavatel – Vlastník byl odhalen v rámci spolupráce na dvou současně prováděných projektech v Praze. Případová studie výše zmíněné partnerství popisuje a představuje hmatatelný zdroj informací pro hlubší analýzu podnikových procesů a pro ilustraci úrovně integrace. Na základě nedostatků zjištěných pomocí podrobné analýzy je jasné, že potřeba zavedení nového manažerského a smluvního modelu je oprávněná.

Sdílení stejných cílů a hodnot je hlavní podmínkou pro úspěšnou spolupráci všech členů týmu. Osvojení základních principů IPD buduje pevné základy pro integraci stran v rámci projektu. Přesun z tradičního řízení projektu na IPD umožňuje vytvořit vyváženou strukturu řízení a definuje role jednotlivých účastníků projektu. Ztráta informací je eliminována vytvořením integrovaného týmu s jasným jmenováním odpovědnosti za jednotlivé úkoly. Tato práce prezentuje nejen návrhy, jak zavést IPD, ale také nastiňuje šablonu IPD smlouvy jež je považována za kritický výsledek procesu iniciace IPD.

Klíčová slova:
Integrované řízení projektu, Plán implementace, Smlouva o spolupráci několika stran, Analýza workflow, BIM

Table of Content

Glossary

To provide better comprehension of some of the expressions and terms mentioned throughout this research, and to provide a useful reference, a brief glossary section is included listing the most important terms and definitions.

Building Information modelling (BIM) is used as a verb or an adjective phrase to describe tools, processes and technologies that are facilitated by digital, machine—readable documentation about a building, its performance, its planning, its construction and later its operation. Therefore BIM describes an activity, not an object (Eastman et al., 2011).

BIM tool is a task-specific software application that manipulates a building model for some defined purpose and produces a specific outcome. Examples of tools include those used for drawing production, specification writing, cost estimation, clash and error detection, energy analysis, rendering and visualization (Eastman et al., 2011).

Business Process Model and Notation (**BPMN**) is a graphical representation for specifying business processes in a business process model. ("Business Process Model and Notation," n.d.)

Incentive Compensation Layer (ICL) is a fund that is increased or decreased based on Project outcome that is distributed upon Final Completion to the Architect, Contractor, and their respective Cost-Reimbursable Subcontractors and Cost Reimbursable Consultants in accordance with their respective percentages. Payment of the ICL is contingent upon achieving the aesthetic, environmental and functional goals of the Project Objective and Implementation Documents, the VTP, VTC and VTS, which cannot be sacrificed to increase the amount of ICL funds available. Design and construction innovations that are consistent with the Project Object and VTP, and reduce cost or schedule without sacrificing quality, can increase the ICL funds available for distribution. (HansonBridgett LLP, 2010b)

Integrated project delivery (IPD) is a project delivery approach that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all participants to optimize project results, increase value to the owner, reduce waste, and maximize efficiency through all phases of design, fabrication, and construction (AIA, 2007).

Integrated Form of Agreement (**IFOA** - a "relational" contract) is a three-way contract between the owner, the architect and the builder. It creates a system of shared risk with the goal of reducing overall project risk rather than shifting it between parties (Cohen, 2010).

Abbreviations:

BV	Mother ship in NL
RED	Service provider to subsidiaries; Real Estate Developer (a.s.)
SPV	Special Purpose Vehicle (a.s.)
A	Architectural office (s.r.o.)
GC	General contractor for RED projects (a.s.)
a.s.	Public limited company ~ N.V. (CZ - akciová společnost)
s.r.o.	Private limited company ~ B.V. (CZ - společnost s ručením omezeným)
Development	RED + A + GC triangle
Group	BV and its subsidiaries (SPVs)

1 Introduction

1.1 Motives

Motives for this research are the inefficiency and the stagnating labor productivity in construction projects (Eastman et al., 2011). Based on a personal experience of the drawbacks of current project delivery methods, this research aims to contribute to an updated and more innovative delivery model. This paper describes how key project participants can actually benefit from integrated form of project delivery, which steps need to be taken in order to set up the collaborative environment and how new technology advances the whole process.

BIM represents a great tool for collaboration and innovation in construction field. However, the number of BIM tools available is not small and may be the reason of adoption difficulties. The attitude of many professionals tends to follow the trend of "we have done it this way for many years" (Kent & Becerik-Gerber, 2010) and as a result their workflow remains the same and innovation stagnates. Therefore, in order to make it easier for stakeholders to implement BIM to their projects, a guide for integration is proposed in the first place.

1.2 Background

In today's world it is easier than ever to share knowledge or to collaborate on projects in big teams of people spread all around the world. Through various web-based technologies people can communicate faster and finish their work increasing its quality and value. Many industries have already implemented modern ICT technologies in order to innovate their processes and products. In the construction field, the BIM implementation process slows down. According to National BIM Report 2015 (Hamil et al., 2015), the BIM usage experienced a small drop from 2014 results. The numbers show that the awareness and usage of BIM has dropped from 54% (2014) to 48% (2015). Despite the decent number of tools that are available on the market not that many professionals decide to implement them to their projects.

BIM has been introduced to construction industry about 30 years ago (Banks, 2014) and only in the past couple years has become a real concern and goal for many professionals. The construction projects are getting more complex as the building technology innovates, new materials are introduced and the energy standards are higher. Information technology evolves even faster and the opportunities created by new software tools for designing and simulations could move the building industry forward.

There is no doubt that these changes create a need for new managerial and contractual scheme. The architects are educated to design the concept and shape of the building; structural engineers are skilled to design the structure and the project managers are there to lead the project, set up the schedule and workflow and make sure the time, quality and costs are meeting the projected expectations. This variety of roles and uniqueness of building projects bring in broad diversity. In many cases that leads to long discussions, disputes, loss of information and delayed project completion. And time equals money. Therefore, the owners' demand for updated project delivery setup is justified.

The fact is that every specialist has its own workflow, software (SW), know-how and number of people in his team with different skills. As well as the risks of conflict emerge where people don't speak the same language, the possibility of misalignments appears between two different data formats. Divergence like this is not easy to unify. Moreover, there is no point in forcing people to go only "one way", innovation stops there.

BIM presents the technical solution for this issue. However, its adoption and usage needs to be defined in order to make it easier for professionals to apply these tools to their workflow. Integration of parties involved in one project appears to be necessary and IPD provides suitable managerial techniques. If all project participants share same values and are willing to collaborate, BIM can be used efficiently.

1.3 Context

Diversity in goals of each profession in construction is rather disturbing. One would think that the main objectives are to build a new building or complex of buildings with specific functionality, size and location, material and quality definition, given budget, timeframe or sustainability evaluation. Truth is that each party ranks these aspirations differently. In this paper, the Case Study is presented introducing key parties and their roles in the projects. The paper also explains parties' various requirements to display the differences.

Owner

With no doubts, the Owner represents one of the main roles. The idea of the project itself is conceived in Owner's head and the selection of project team is very often defined by his previous experience or referrals. Most importantly, the budget and the time frame are outlined. Owner is the initiator but in most cases the least experienced party in the process. The Owner Is likely less experienced and skilled to successfully establish the managerial system and control each party and their performance on his own.

Architect

Architect is the key personnel whose purpose is to study variety of aspects to define the concept, limits and opportunities and deliver a value to the project. His role is of great

importance for the success of the project. Wide scope of knowledge is required from social and psychological background, through history of art and architecture to technical and basic economic skills. The art soul of architects is the determining one and leads to many great ideas and also to many great misunderstandings.

Engineer

When the architectural design is finished it needs to be studied and the structure must be defined. Structural Engineer steps in and specifies the bearing structure; the MEP engineers design the HVAC systems, plumbing, and power distribution or fire protection. Many more specialists are often invited to share their experience. Each of these engineering professions consists of many layers and is very complex just on its' own.

Contractor

Contractors plan, estimate, control and deliver the project. They follow the plans and models from Architects and Engineers; point out issues or clashes, report to the Owner and much more. Their experience with building technology, project planning and estimating is required and their input can be very beneficial especially in the pre-design and design phase of the project.

Operator / Facility Manager

The life cycle of the building can be simplified into several phases:

Pre-Design – Design – Construction – Operation & Maintenance (O&M) – Renovation – Demolition

The phases of O&M and Renovation are the longest out of all these phases in the life cycle and therefore it is necessary to count with this fact from the conception of the project itself. It is critical to involve Facility Managers in the project in the right time and acquaint them with the details and operation processes. Their main task is to secure proper building functionality over the life cycle.

Apart from being the longest phases the financial burden is blindingly obvious. For instance, the future costs of Healthcare facilities can reach 85% of the total project costs over the life cycle (Vogel, 2015). If considered carefully in the pre-design and design phase it can make a great impact on the building Owners' and Users' satisfaction.

Just by listing the key parties in construction project and their fields of interest it is obvious that the scope of work is fairly wide. The number of professionals and specialists needed for accurate and effective building design predicts confusion and inability to agree. Not even talking about the number of different SW tools that can be used to design and operate the building. It is impossible to let the project flow naturally and see what happens in the

end. Beyond question, the need for the Integrators and guide for project coordination is indisputable.

1.4 Research questions

1.4.1 Problem areas and research questions

There are two problem areas detected for more profound analysis in this paper. First area introduces workflow of a construction project and managerial characteristics that arise from the contractual setting. The second area includes technical aspects that are related to SW tools usage.

Problem area A: Managerial & Contractual aspects – No guidance & legal environment support

Main goals of every (building) project are to be completed on time, within the specified budget, and built to the specified quality standards. Therefore, adequate project management has to be pursued. The trend nowadays, in the age of shared knowledge and possibility to communicate very fast and very often, is to collaborate and share risks and rewards as well. In this set up of parties with slightly different interest a change in contractual and managerial techniques is necessary. Moreover, if BIM tools are implemented, it is vital to define the workflow and the adoption process.

Q-A1: What is the current workflow situation of projects developed by RED?
Q-A2: What kinds of managerial/contractual improvements are crucial to adopt for efficient collaboration?

Problem area B: Technical aspects – efficient software tools usage

In today's market, there are many BIM tools ready to use and even more are being developed. However, it is often hard for professionals to keep up with updates and upgrades. Moreover, it is a challenge to even start using advanced tools due to the lack of needed knowledge and mainly the amount of time and effort that needs to be put into such a process.

Q-B1: Which SW tools are used in nowadays practice?
Q-B2: How can the SW tools usage become more efficient?

1.4.2 Research objectives and limitations

Main objective of this research is to design IPD adoption manual for the key stakeholders involved in construction projects within the Development. This research also presents challenges of the adoption process and discusses the main issues and problems that make the transition difficult.

1.5 Research approach

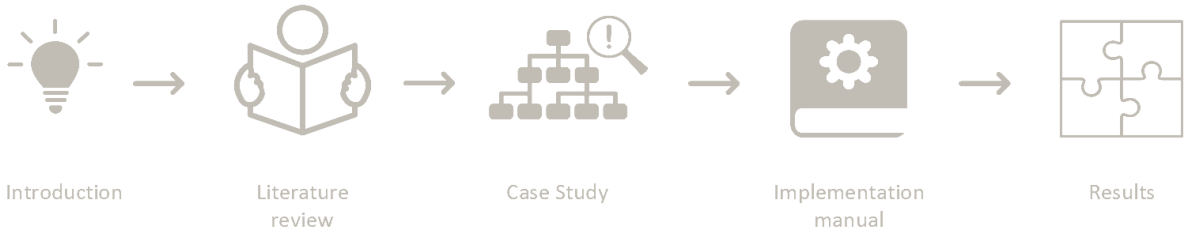

Figure 1: Research approach

The core of this thesis is split into four sections (Figure 1). Following paragraphs briefly introduce each section's focus to provide better understanding of the structure of this paper.

1.5.1 Literature review

IPD is not a new term in construction industry. Decent number of studies, books and research papers is focused on the implementation and procurement of projects in a collaborative manner. Therefore, concepts and principles of IPD are presented briefly in Chapter 2 to provide fundamental theoretical background. Chapter 3 describes specific steps that need to be taken in order to adopt IPD in a project. One of the critical steps in IPD adoption is entering into an integrated form of agreement. Different forms of available multi-party agreements are compared in Chapter 3.2 and this comparison is later applied in the Implementation section.

1.5.2 Case Study

The practical model of this paper focuses exclusively on the case of young Real Estate Development Company (RED) with its headquarters in Prague, the Czech Republic. Their ambition to create unique architecture through alliance of the traditional triangle (Architect-Owner-General Contractor) initiated the need to explore how IPD can be adopted. With a vision of close collaboration of the Architect and Contractors; RED launched two large projects that involve renovation of historical palaces with a touch of modern architecture in the historical centre of Prague.

In Chapter 4, the profile of RED, Architect and General Contractor is presented along with a detailed description of current projects. BPMN technique is used in Chapter 5 to illustrate the workflow processes and indicate the main problems that occur during the project delivery. Several critical issues are detected and described in detail. These issues present motives for improvements of processes and workflow.

1.5.3 Implementation manual

The manual for IPD adoption is introduced in the Implementation section of this paper. Based on the comparison of different IFOA templates in Chapter 6.1 the multi-party agreement is proposed. The impact caused by its adoption in the Development is illustrated using updated BPMN schemas from Chapter 6.2. Expected results of successful

implementation process are discussed and provide overview of the added value of this transition to the Sponsor.

1.5.4 Results

Chapter 7 draws conclusions regarding the scientific and societal relevance of this research. According to the outcomes of the research, unknown areas are detected to provide ideas for future research topics.

1.6 Expected results

The aim of this research is to explain the process of IPD adoption and the improvements required in the contractual and managerial process as well as the technical conditions to increase productivity using BIM technology. Therefore, a guide for IPD adoption is proposed. This guidance explains the organizational and managerial transition process and proposes a IFOA template suitable for the Development. The guidance is customized entirely to the Case Study and adequate approach is selected so that it meets all the requirements expected by the company.

Literature review

2 IPD as a managerial approach to collaborative project delivery

2.1 Concepts of IPD

Integrated Project Delivery is a comprehensive process that incorporates programming, design, construction and building operation (Cohen, 2010). Since the IPD field is very broad this chapter introduces the key theoretical principles (outlined in Table 1) that need to be understood before the practical application.

As can be seen in Table 1, there are three groups of IPD principles – behavioural, contractual and catalysts. Before entering into a collaborative environment the attitude among parties has to follow the behavioural rules. All parties have to be motivated to work together and often change their old habits. However, the willingness and trust are not the only conditions.

IPD brings all the key stakeholders together and presents a project delivery in which there are consequences for each parties' behavior (HansonBridgett LLP, 2010a). Therefore, proper form of agreement (IFOA) that ties parties together but still provides flexibility and innovation is fundamental. Multi-party agreement is listed as a catalyst for IPD. Catalysts are not necessarily needed for the start with IPD but they make it better.

Table 1: IPD principles based on NASFA et al. (2010)

BEHAVIORAL PRINCIPLES
Mutual respect and trust
Willingness to Collaborate
Open communication
CONTRACTUAL PRINCIPLES
Key participants bound together as equals
Shared financial risk and reward based on project outcome
Liability waivers between key participants
Fiscal transparency between key participants
Early involvement of key participants
Intensified design
Jointly developed project target criteria
Collaborative decision-making
CATALYST FOR IPD
Multi-party agreement
Building Information Modelling
Lean design and construction
Co-location of team

2.2 Phases of Project

IPD pursues early involvement of parties and therefore, the project phases differ from the traditional model. The effect of moving the effort of all participants to the earlier stages of the project can be seen on the MacLeamy curve (Figure 2). The graph illustrates the concept of making decisions earlier when opportunity to influence positive outcomes is maximized and the cost of changes minimized (AIA, 2007).

As can be seen, in the traditional project delivery more effort is put into decision making later on and that results in costly solutions. Therefore, making the right decisions at the start of the project, preferably in the conceptual development phase, can lead to much more satisfying outcomes.

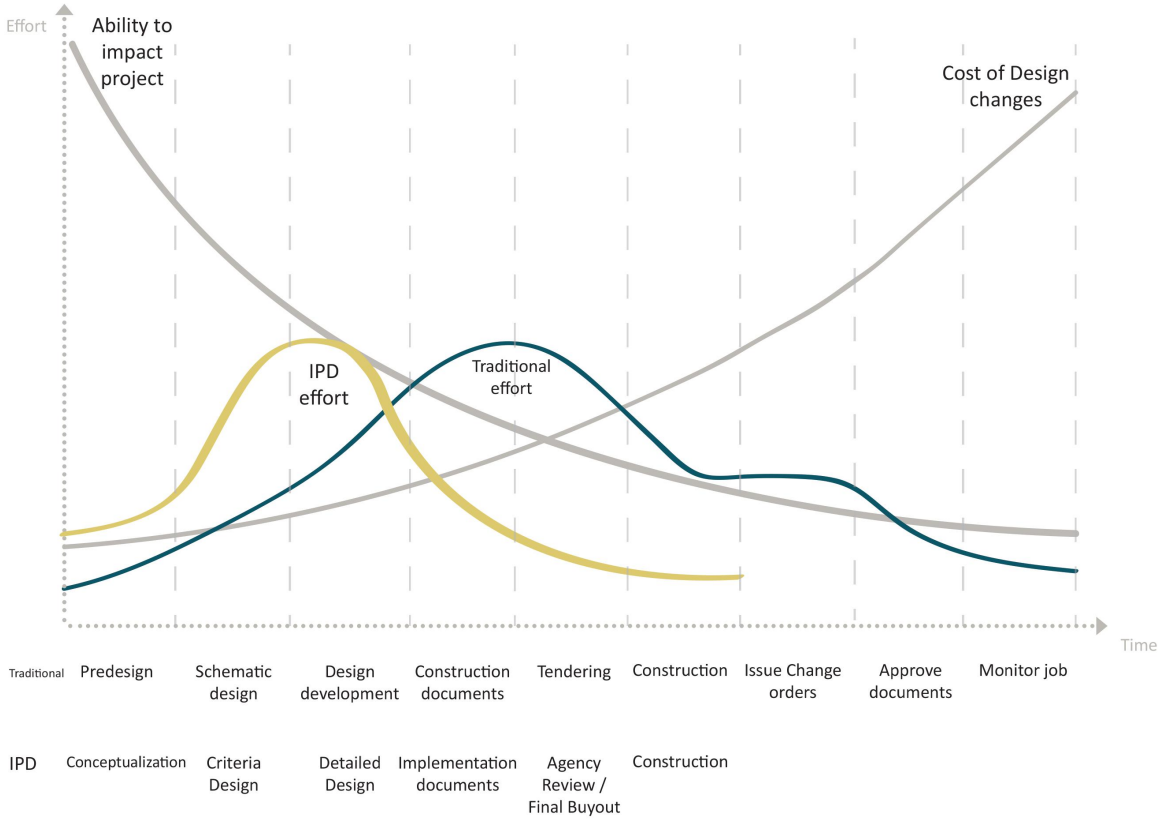

Figure 2: MacLeamy curve (Kensek, 2014)

By re-thinking the project delivery methodology newly defined phases replace the traditional stages of a project. In Table 2 the overview of phases and desired outcome is presented based on the IPD Guide by AIA (2007).

Table 2: Phases of IPD project (AIA, 2007)

phase	outcomes
Conceptualization	*begins to determine WHAT is to be built, WHO will build it, and HOW it will be built* Performance goals are developed by the team Cost structure is developed earlier and in greater detail than a conventional project Preliminary schedule is developed and linked to developing model (BIM) Communication methodologies and technologies are identified and key parameters agreed upon
Criteria Design	*the project begins to take shape, major options are evaluated, tested and selected* Following aspects are finalized: – Scope – Form, adjacencies and spatial relationships – Selection and initial design of major building systems (structure, skin, HVAC, etc.) – Cost estimate (at appropriate precision) – Schedule (at appropriate precision) Agreement is reached on tolerances between trades to enable prefabrication.
Detailed Design	Building is fully and unambiguously defined, coordinated and validated – All major building systems are defined, including any furnishings, fixtures and equipment within the scope of the project – All building elements are fully engineered and coordinated. The team will have collaborated to resolve any inconsistencies, conflicts or constructability issues – Agreement is reached on tolerances between trades to ensure constructability and to enable as much prefabrication as possible. – Quality levels are established Prescriptive Specifications are completed based on prescribed and agreed systems Cost is established to a high level of precision Construction schedule is established to a high level of precision
Implementation Documents	*effort shifts from WHAT is being created to documenting HOW it will be implemented* Construction means and methods are finalized and documented Construction schedule is finalized and agreed upon Cost is finalized and agreed upon Costs are tied to the model The specifications are finalized, supplementing the model with narrative documentation of the design intent wherever necessary Implementation Documents define and visualize the project for participants who aren't involved in the development of the model, providing: – A "finance-able" project (a completed model that gives "the bank" sufficient detail to finance the project) – Bid documents for parties outside the integrated process The "shop drawing" phase that in traditional phases occurs after Construction Documents will be largely completed during the Implementation Documents phase Prefabrication of some systems can commence because the model is sufficiently fixed (object sizes and positions are frozen) to allow early purchasing and prefabrication to begin
Agency Review	All necessary permits and approvals
Buyout	Commitments are in place for all work, materials and equipment needed to complete the project
Construction	Substantial Completion of the project, characterized by: – Virtually no RFIs from major trades because prime constructor, key trade contractors and key vendors have been involved in developing the design intent and implementation – Less construction administration effort required because submittals for key scopes of work have already been integrated into the model and conflicts have been resolved virtually – Better understanding of design intent by all participants because the BIM provides effective visualization – More pre-fabrication resulting in: – Less waste because more assemblies are factory generated. – Fewer injuries because more work is being performed in a more controlled environment – A schedule tied to the model to allow visualization of crew coordination and deviations from planned sequences and durations

	– Some elements of current construction administration will remain similar to current practice
	  – Quality control, inspection and testing will be relatively unchanged
	  – Changes within the agreed project scope will be virtually eliminated, but owner-directed changes will need to be formally negotiated
	  – Scheduling and progress will be periodically reviewed

Closeout	A complete building information model reflecting "as-built" conditions will be provided to the owner for long term use for building management, maintenance and operation. This model can also be used for: – Integration of building monitoring, control and security systems – Comparing actual performance of building and systems to planned performance – Referencing of warranty, operation and maintenance information Traditional warranties will remain for installation quality and defective products.

The difference between parties' involvement in the traditional and integrated project delivery is evident on Figure 3. The prior focus not only on the *What* but also *How* and *Who* regarding the task performance leads to sooner involvement of all important partners and therefore earlier completion of all necessary documents before the realization of the project. Also, the early, non-price-based involvement of a wide range of sources of expertise for intensified planning utilizing the most advanced technologies and management approaches is the most striking property of IPD compared to other project delivery methods (Lahdenperä, 2012). Referring back to the MacLeamy curve, this leads to cost and time efficiency and overall satisfaction among the consortium.

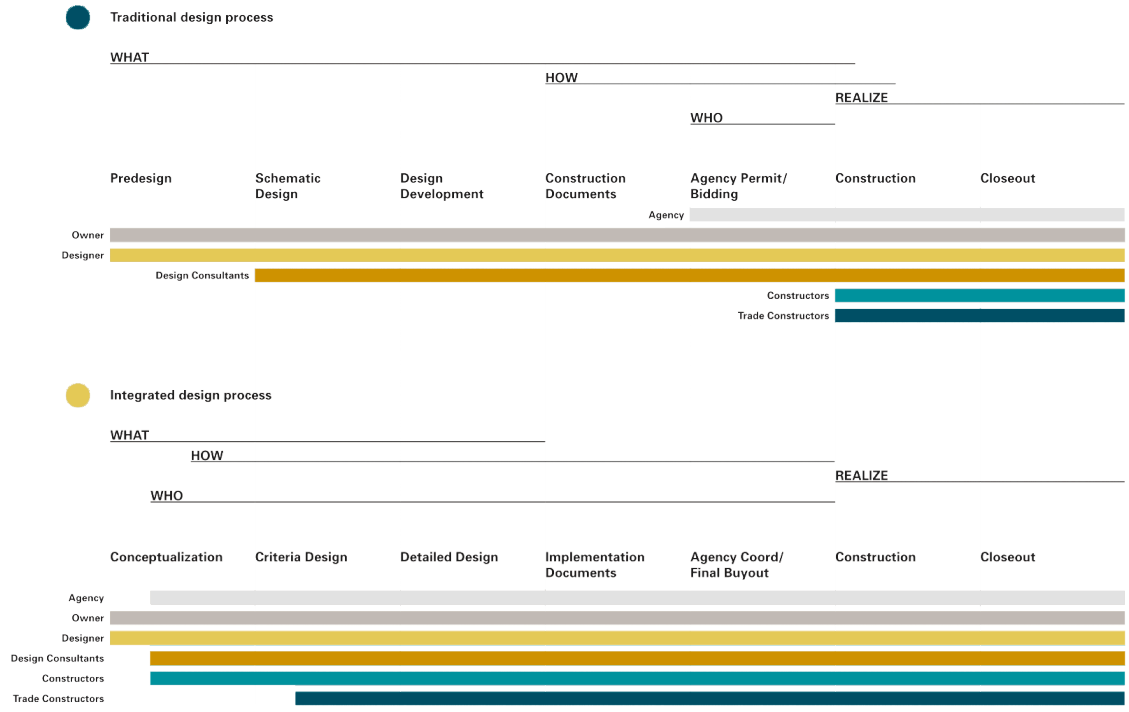

Figure 3: Parties' involvement comparison within traditional and integrated approach (AIA, 2007)

2.3 BIM and IPD

BIM is in many cases still viewed as an ICT (information and communication technology) tool only and therefore applied in the project not until it reaches the operational level (Sebastian, 2011). However, BIM and IPD go together and their application in construction projects represents an opportunity to break current linear processes that are based on paper exchange of information (Eastman et al., 2011). It is more than reasonable to adopt BIM technologies when collaborating on complex projects where many parties are involved.

In traditional projects it is typical for some consultants to “hide behind their drawings” and resist providing detailed information until others have done so, allowing the late deliverers to benefit from the problem solving process undertaken by the rest of the team, while avoiding the extra effort required to be involved in that process (Davies & Mcmeel, 2013).

According to Eastman et al. (2011), when the owner uses Integrated Project Delivery (IPD) for project procurement, BIM can be used by the project team from the beginning of the design to improve their understanding of project requirements and to extract cost estimates as the design is developed. Based on Bynum, Issa, & Olbina (2013), in terms of project delivery methods, a majority of the survey respondents (77%) believe that design/build (40%) and IPD (37%) are the optimal project delivery methods to integrate BIM as a sustainability tool.

BIM is considered as one of the catalysts for IPD (NASFA et al., 2010) and therefore it is not required to use BIM tools when adopting this project delivery method. However, it highly increases the overall efficiency and brings needed innovation to the construction industry.

3 IPD adoption process

Prior to adoption of IPD there are necessary steps that need to be taken in order to transfer the outdated project delivery approach into new efficient model. In Chapter 3.1 the process of managerial transition to IPD is outlined.

Several publications that are providing a guidance to IPD adoption can be found. The final guidance for the Development presented in Chapter 6 is inspired by bellow listed publications and their approach:

- AIA (2007) with its IPD Guide was among the first who drafted the guidance for setting up the integrated project.

- Duke et al. (2010) provide a roadmap to IPD evaluation and implementation on Healthcare Capital Project and define steps of the IPD initiation process as the crucial phase before each project is launched.

- Ashcraft (2012) stresses the importance of the Macro-framework that governs the project and the Micro-Framework structures and procedures that implement the IPD principles at an immediate level.

Chapter 3.2.1 presents a comparison of different contract structures that were developed for IPD projects. The multi-party agreement outline presented in Chapter 6.1 is based on the assessment of these contracts' templates:

- AIA C191-2009 (AIA, 2009a)

- Consensus DOCS 300 (ConsensusDocs 300, 2008)

- IPD Agreement (HansonBridgett LLP, 2010b)

3.1 Steps of IPD initiation process

Based on the expertise of Duke et al. (2010) several steps of the implementation process are defined (Figure 4). In chapters 3.1.1 - 3.1.5 each step is discussed in detail.

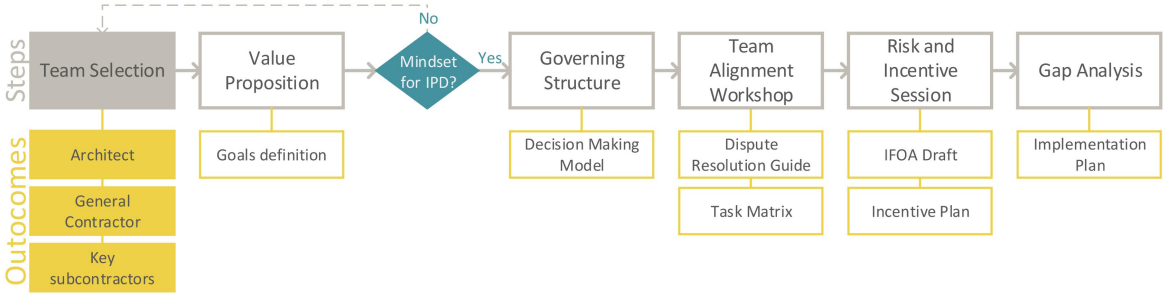

Figure 4: Steps of IPD implementation process inspired by Duke et al. (2010)

3.1.1 Team Selection and Value Proposition

Team selection

Integrated project delivery promotes collaboration and therefore it is necessary to select right team players. Regarding current projects and set up of the Development, the step of Team selection is already completed. The Sponsor selected the Lead Architect and the General Contractor based on his previous experience. Team of consultants was founded in the form of Real Estate Development company and it represents Sponsor's interests during the projects' lifecycle.

Value Proposition

At the beginning, Value Proposition for the project is developed. It defines exactly what the team is trying to accomplish with the project and identifies how the project will bring value to the strategic mission of the consortium (Duke et al., 2010).

In case of the Development, the value proposition is unclear. Current projects are in the construction phase already, more and more entities get involved in projects not knowing about the core goals and values. It is due to the lack of proper project goal definition. Therefore, it is necessary to bring key stakeholders in one room and discuss the vision and compare it with the reality. Even though projects are under construction and it may seem too late to discuss visions the goal definition can be done anytime. Furthermore, reflection on the current workflow can be done and with the experience on current projects the goal setting may be more realistic and mature.

Once the value proposition is confirmed, the Development should study the IPD process to determine if it truly provides the best solution to accomplish their goal. IPD is implemented for the project only if the outcome is affirmative. Only if the mind-set of all participants indicates interest in IPD and all of them are willing to take the risk of doing something new.

3.1.2 Governing Structure

The Governing Structure manages behaviours of parties and defines the decision making process. Both of the previous are developed during the Team Alignment Workshop (Chapter 3.1.3). The current Governing Structure of the Development is illustrated on Figure 5.

The day-to-day management of the project is handled by the IPD Team. This group is made up of representatives of the key stakeholders in the project. In the Development projects the team involves members of RED, A and GC that have the day-to-day responsibility on the project. They meet weekly and at least one meeting per month is focused exclusively on team dynamics and behaviour.

The IPD project is led by a Senior Management Group. They set boundaries that the IPD Team must stay within. The group includes senior level executives (mainly Partners) from all parties including the RED, A and GC. The suggested frequency of meetings is once a month and all critical decisions that may affect scope, schedule and budget are made at this level; except the decisions that may lead the project outside the boundaries. Finally, the Sponsor makes the final call in case the decision cannot be made in the lower layers.

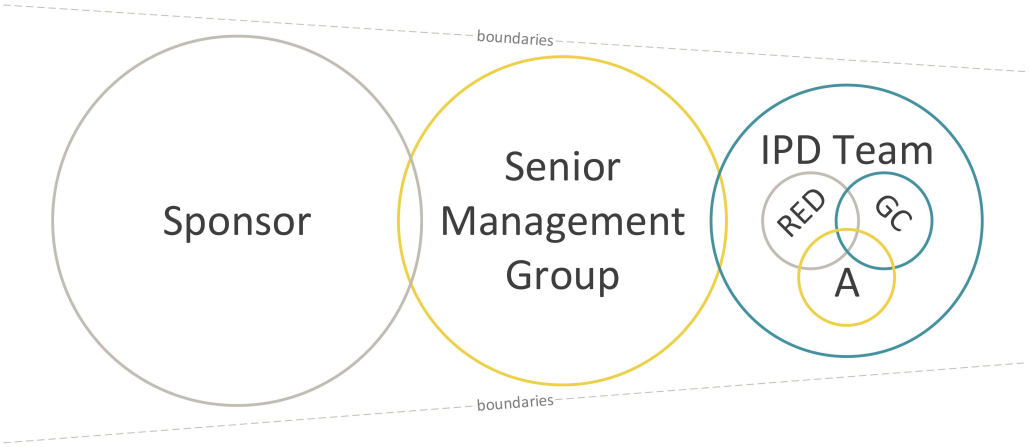

Figure 5: Governing Structure

The outcome of the Governing Structure step is the proposal of Decision Making Model that can be seen on Figure 6. It is important to notice that the IPD Team is empowered to make decisions in order to maintain progress. However, if the voting of the IPD Team is not unanimous the decision has to be made by the Senior Management Group and approved by the Sponsor. If Sponsor objects and his directive negatively affects the target cost or schedule the dispute process follows.

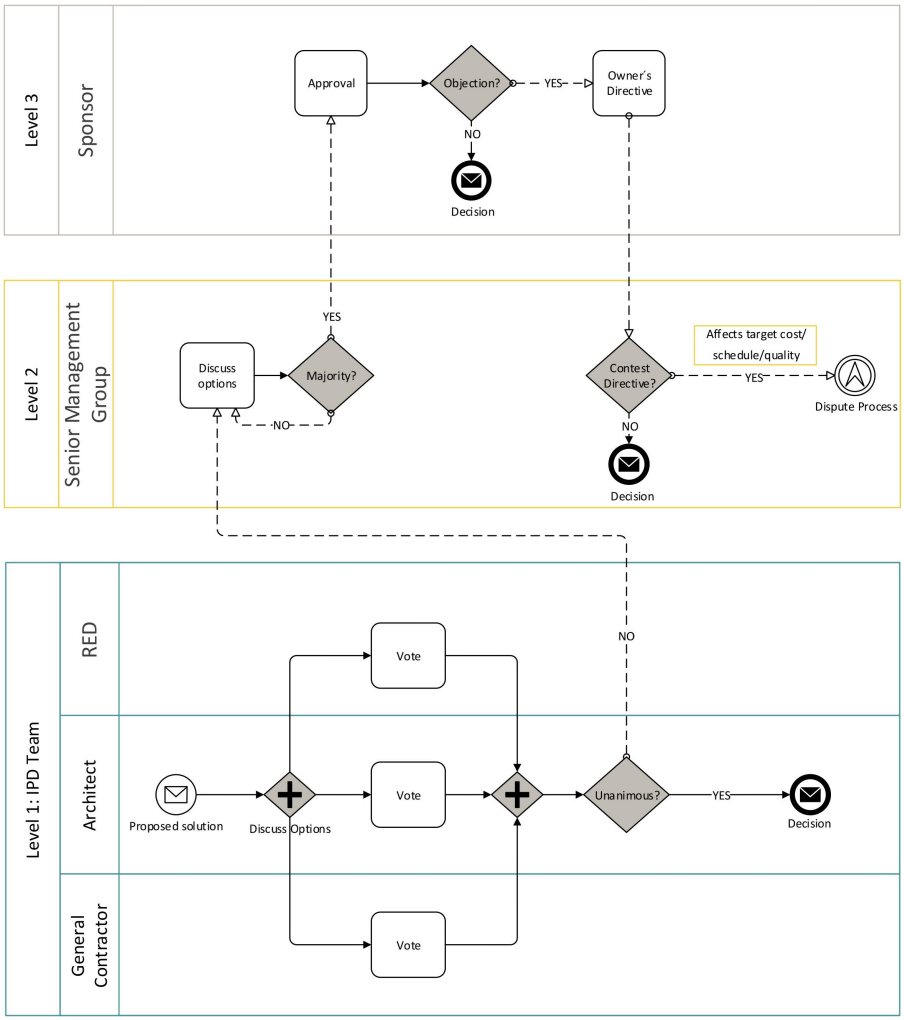

Figure 6: Schema of the Decision Making process based on Ashcraft (2012)

3.1.3 Team Alignment Workshop

As can be seen on Figure 7, there are several overlaps in the structure of IPD Team. These areas represent relationships or processes among parties that need to be analysed. Based on profound analysis of these overlaps we can develop the Contract Task Matrix and the Dispute Resolution guide.

The Team Alignment workshop is organized in order to analyse processes within the IPD Team. Since there are not that many people involved in current projects of the Development the workshop appears to be more transparent because everyone's opinion can be considered in the discussion. The goal of the workshop is to develop the Contract Task Matrix as well as a Dispute Resolution guide. The task matrix helps to define responsibilities of each party and their relationships. The Dispute Resolution guides the Decision making process in case that parties have hard time finding the common ground.

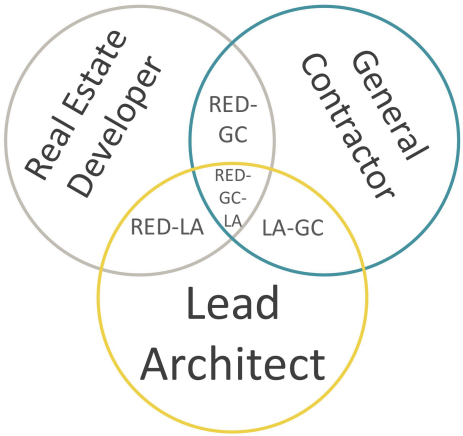

Figure 7: IPD Team overlaps

Contract Task Matrix templates

Following the C191-2009 document (AIA, 2009b), the Exhibit D-DD includes the spreadsheet listing the integrated scope of services (example can be found in Appendix C). The matrix identifies the tasks required to plan, design and commission the project. In this spreadsheet, parties decide who either performs the task, who is responsible for coordination or who assists in performing the task. Therefore, it is recommended to follow this spreadsheet in order to cover all tasks in all phases of the project.

Even more options of responsibilities' assignment are provided in the Contract Task Matrix of IPD Agreement (HansonBridgett LLP, 2010b). Responsibilities are rated as following:

Table 3: Matrix Key (HansonBridgett LLP, 2010b)

responsibility	description
Sole	solely responsible for task completion
Primary	primary responsible but will be assisted by others
Joint	parties are equally responsible
Contributing	parties participate in the task but are not jointly responsible
Design Assist	Contractor and subcontractors with design assist responsibility will assist the design team by providing constructability and cost consultation and analysis, but do not have responsible charge of the elements being designed.
Design/Build	Contractor and subcontractors with design/build responsibility for the design, engineering, detailing and implementation of a building component system are responsible for coordinating the design/build component or system within the overall project design. The Design/Builder will be the architect or engineer of record or will retain licensed professionals to perform all design services.

However, the matrix outlined by HansonBridgett LLP (2010) is less specific in the tasks' definition. Therefore, a combination of both previously mentioned templates is recommended using the task definition of the C191-2009 matrix and the matrix key of IPD Agreement.

Nevertheless, to arrive to useful resolutions it is necessary to appoint a catalyst of the discussion who oversees the efficiency and objectivity of the discussion. It is recommended to hire an external agency to help organize and supervise this workshop so that the results are applicable and unprejudiced.

3.1.4 Risk and Incentive Session

In this step, the IFOA and the Incentive structure are determined. At first, appropriate contract form is selected. In Chapter 3.2.1 detailed comparison of available IPD contract templates is provided. When the IFOA draft is prepared the Incentive Plan is defined.

Incentive Plan defines who participates in the incentive layer or what is the incentive tied to. Creating an Incentive Plan that is objective and fair to all parties on an IPD project is difficult. All parties work together on one platform and they share profit and cost overruns in the same time. Working in a collaborative manner eliminates the protection of parties provided by standard contracts. They no longer have guarantees of standard professional care and liability insurance programs. However, these guarantees have resulted in a highly inefficient and broken delivery model (Duke et al., 2010). Therefore, the Incentive Compensation Layer (ICL) is defined and determines the amount agreed by the IPD Team. The proposed ICL distribution is further explained in Chapter 6.1.

After the definition of incentive, the draft of IFOA is negotiated. It is recommended that the IFOA draft is negotiated at maximum two times before the final agreement is agreed on by all. Because the IFOA guides governance, behaviours and incentives on an IPD project, it is important that the agreement is signed during the IPD Initiation Process (Duke et al., 2010).

3.1.5 Gap Analysis

The last step of the IPD Initiation Process recommended by Duke et al. (2010) is the Gap Analysis. Using the outcomes of the previous steps the IPD Team analyses all the known and unknown data and information related to the project. The outcome of this process is the Implementation Plan that presents a road map to IPD adoption and eliminates the gaps discovered.

3.2 Multi-party agreement

According to the IPD principles one of the IPD catalysts is a Multi-party agreement that helps parties avoid arguing about the wrong things. Entering the project in integrated way demands integrated form of agreement (IFOA) that distinctly defines relationships, liabilities, goals, risks or rewards. Trust and willingness to collaborate are crucial aspects of the mind shift from traditional to integrated environment. However, only when all key stakeholders are formally bound to each other the collaboration can be beneficial and fair to all.

Table 4: Contract mind shift based on Ashcraft (2010)

TRADITIONAL	IPD
Prescriptive	Flexible
GMP/Fixed	Target Cost
Contingency	Target Adjustment
Liability Transfer	Liability Waiver

Flexible

Traditional contract states what can happen if things go wrong but not much about how to achieve anything. IPD Agreement explains who has the authority to do certain things in order to make the project go further. Comparable to constitution, IPD Agreement declares how to do things instead of what and when should happen.

Target Cost

GMP or Lump Sum contracts create a conflict of interests almost instantly. Most of the litigations are caused under the GMP contracts (Ashcraft, 2010).The Target Cost on the other hand reduces risk and fear, increases creativity and focus on the desired outcome.

Target Adjustment

The mind shift from contingency focus to adjusting the targets is more important in the IPD agreement.

Liability Waiver

Liability Waiver prevents transferring liabilities from one party to the other.

3.2.1 Comparison of IPD Agreements

Following tables present comparison of three bellow listed contracts that have been established to support the IPD projects. The data presented in these tables are based on Dal Gallo et al. (2009) analysis. Every contract form is slightly different as well as every construction project varies from the other. Therefore, it is necessary to consider the differences and seek for legal advice before the official engagement of parties.

AIA C191-2009

The C191-2009 Document (C191) developed by American Institute of Architects (AIA) presents a three party agreement. There are two levels of management proposed by this agreement – Project Management Team (PMT) and Project Executive Team (PET). According to Dal Gallo et al. (2009), the contract is unclear in stating which team (PMT or PET) has the authority in what. However, the agreement declares that cost and schedule are approved by the PET and also that PET can override the decision made by PMT.

C191 puts 100% of the profit at risk if the project is not delivered within the target cost and it can also allow parties to put their labour costs at risk if they choose to. There is nothing in the agreement that discuss a participation of Key subcontractors on risk or reward sharing on the project. The contract is written in the traditional AIA style and therefore terms are more familiar to professionals who were previously introduced to other AIA contracts.

Consensus DOCS 300

Consensus DOCS 300 was developed by a consortium headed by Associated General Contractors of America (AGC). The contract allows parties to decide whether their project leans more towards traditional or integrated project delivery. However, due to the fact that target cost is set after the construction documents are 100% completed, the contract takes more traditional approach to pricing and avoids one of the key concepts of IPD which is the Design Optimization. The Owner has the final say if the decision is not made on consensus by the PM team. Risk sharing is optional as well as the Liability Waiver. The Consensus DOCS 300 has not been updated recently and presents rather mixed or more traditional approach to project delivery.

Integrated Project Delivery Agreement (IPD Agreement)

Out of the three agreements, the IPD Agreement presents compressed but still accurate form of contract written in business English format. It is a three party agreement built on the key concepts of IPD. Each party is represented in the PMT and the team makes decisions unanimously. The key asset of the IPD Agreement is presented by the flexible ICL tied to cost, schedule and quality of the project. Stakeholders can choose percentage of profit at risk and also allow key subcontractors to participate on risk/reward sharing. The compensation system supports creativity and reduces the fear of failure. This aspect predicts great incentive to all parties. Collaboration is supported by establishing one project management team that jointly develops the Project Objective.

Table 5 offers a short comparison of key characteristics of each contract and further details are described in Table 6. The detailed comparison is divided into sections related to the key IPD Elements and Outcomes stated by Ashcraft (2012).

Table 7 presents the structure of each contract by comparing the table of articles of each. Table 8 compares the exhibits of IPD Agreement and C191 and shows the similarities of content.

Table 5: IPD Contracts Comparison based on Dal Gallo et al. (2009)

IPD Agreement	AIA C191-2009	CONSENSUS DOCS 300
3 party agreement	3 party agreement	Check the Box Approach
PMT Manages and Controls Project	2 levels of Project Management (PMT and PET)	PM Group of Architect, General Contractor and Owner - Owner Has Final Say
Key Subcontractors Participate ICL/Risk	Key Subcontractors Do NOT Have Stake	GMP w/ Savings Participation
Cost, Schedule and Quality Tied to Incentive	Schedule and Quality NOT Tied to Incentive	Target Set After 100% Completion of Construction Documents
Percentage of Profit at Risk	100% Profit at Risk and "Labour Costs"	Risk Sharing Optional
Limited Liability	Limited Liability a. Liquidated Damages Possible b. Excludes Insured Claims	Liability Waiver Optional
Business English Format	Traditional AIA Style	-
Streamlined Dispute Process	Too Many Defined Terms	Inconsistent Terms Within and Between Consensus DOCS

Shortcuts in alphabetic order:
GMP – Guaranteed Maximum Price | ICL – Incentive Compensation Layer

Table 6: Detail Contract Comparison based on Dal Gallo et al. (2009)

	IPD Agreement	AIA C191-2009	CONSENSUS DOCS 300
Design Optimization	**IPD Approach** _Before Conclusion of Conceptualization Phase (Target Cost Set VTC, Target Schedule Set VTS) _Developed by Team	**IPD Approach** -Target Cost Set Before Conclusion of Criteria Design -A and GC Propose to Owner -Schedule Not Explicitly Included or Linked	**Traditional Approach** -PTCE Based on 100% CDs
Joint Validation of Targets	**IPD Approach** _PMT Jointly Develops Project Objective (Explicit Recognition of Scope/Cost/Schedule) _Termination if Consensus Not Reached	**IPD Approach** _A&GC Develop Target Criteria _Owner Approves or Disapproves (No Explicit Recognition of Scope/Schedule) _Termination if Owner Objects (Option for GMC, Compensation Unclear)	**Mixed Approach** _PM Group Jointly Approves PTCE _If Proposed PTCE Exceeds Owner's Project Budget Owner Can: a. Increase Project Budget or Terminate b. Renegotiate or Rebid c. Value Engineering
Joint Project Management	**IPD Approach** 1. PMT (Unanimous) 2. Owner/A/GC 3. Senior Management (Majority Vote) 4. Owner's Directive _Less Layers than C191	**IPD Approach** 1. PMT (Unanimous) 2. PET (Unanimous) 3. Dispute Resolution Committee (Senior + Facilitator) 4. Owner's Directive _Authority of PMT/PET/Parties Unclear	**Mixed Approach** 1. PM Group 2. Other Key Participants but with Limited Voting _Decisions a. Consensus b. Owner Decides
Skin in the game	**IPD Approach** _A/GC/CRS/CRC Compensated for Allowable Costs _ICL Funded Through % of A/GC/CRS/CRC Profit _ICL is Increased or Decreased (risk pool) Depending on Project Outcome _If Project is Not Delivered Within VTC or VTS: a. ICL is Decreased to Cover Project Allowable Costs b. if ICL Exhausted, Owner Pays Direct and Indirect Costs Through Final Completion (no profit)	**Mixed Approach** _Incentive through Savings Participation and Goal Achievement _Goal Achievement Not Dependent on Target Cost _If Target Cost Exceeded, Check Box Option: a. 100% Profit at Risk b. Labour Costs May Be At Risk _Key Subs & Consultants Don't Participate _Schedule & Quality Not Tied to Incentive	**Mixed Approach** _Can Have Incentive and Risk Sharing Between Parties _If PTCE is Exceeded: a. Owner Nears Entire Cost Overrun b. Cost Overrun shared by parties c. Fee May or May Not Be At Risk
Liability Waivers	**Waiver of Claims Except:** _Excluded Claims _Wilful Default	**Waiver of Claims Except:** _Excluded Claims _Insured Risk _But Liquidated Damages?	**Traditional Liability** - No Waiver Safe Harbour _Waiver for "Joint Decisions" _Except Wilful Default
Indemnity	**Comparative Fault** (Bodily Injury & Property Damage) _Party Only Liable to Extent Act/Omission Caused _Reimbursed for Defence Costs Paid in Excess of Liability	**Comparative Fault** (Bodily Injury & Property Damage) _Party Only Liable to Extent Act/Omission Caused _Reimbursed for Defence Costs Paid in Excess of Liability	**Comparative Fault** (Bodily Injury & Property Damage) _Party Only Liable to Extent Act/Omission Caused _Reimbursed for Defence Costs Paid in Excess of Liability
Insurance	**Traditional Insurance Default**, but OCIP or CCIP Recommended	**Traditional Insurance Default**, but _OCIP or CCIP Recommended _Insured Claims Expected from Liability Waivers	**Traditional Insurance**

Shortcuts in alphabetic order:
CCIP – Contractor Controlled Insurance Program | CRC – Cost Reimbursable Consultants | CRS - Cost Reimbursable Subcontractors | ICL – Incentive Compensation Layer | OCIP – Owner Controlled Insurance Program | PTCE – Project Target Cost Estimate

Table 7: IPD Contracts' Structure

IPD Agreement	AIA C191-2009	CONSENSUS DOCS 300
Definitions	General Provisions	Agreement
The Project And Relationship Of The Parties	Management Of The Project	Definitions
The Parties	Responsibilities And Parties	Collaborative Principles
Project Management Team	Compensation	Management By The Management Group
Project Implementation Team	Target Criteria Amendment And Target Cost	Owner Provided Information
Award Of Subcontracts And Consulting Agreements	Force Majeure	Development Of Design And Collaborative Preconstruction Services
Responsibilities By Phase	Insurance And Bonds	Project Planning And Schedule
Compensation	Risk Sharing	Project Budget, Cost Modelling And Project Target Cost Estimate
Incentive Compensation Layer	Dispute Resolution	Designer's Compensation
Payment	Suspension And Termination	Constructor's Compensation
Contract Time	Miscellaneous Provisions	Incentives And Risk Sharing
Change Orders	Scope Of The Agreement	Trade Contractors And Subcontractors
Liability Allocation	Exhibits	Construction Operations
Warranty		Designer's Construction Phase Services
Dispute Resolution		Time
Default, Suspension And Termination		Designer's Compensation And Payment
Miscellaneous Provisions		Cost Of Work
Exhibits		Payment
		Right To Audit
		Changes
		Indemnity, Insurance And Bonds
		Suspension, Notice To Cure And Termination Of The Agreement
		Dispute Resolution
		Miscellaneous
		Contract Documents

Table 8: Exhibits Comparison

IPD Agreement	AIA C191-2009
Definitions	General conditions
-	Legal description of the project
Project Objective and ICL	Project definition
	Project goals
	Project schedule
	Owner's criteria
Contract Task Matrix	Integrated Scope of Services
Staffing plan	-
Cost Management Strategy	-
PMT Work Plan	-
BIM Workflow Plan	BIM protocol
	Digital Data protocol
Architect's Allowable Costs	Target cost breakdown
Contractor's Allowable Costs	
Insurance	

3.3 Summary

This chapter presented the essential steps for successful adoption of IPD principles and the key outcome of this process – Multi-party agreement. Once the project initiators decide on establishing the IPD it is critical to bring key people to a workshop and follow the recommended steps to reach the global agreement.

When starting with IPD the Team selection is the first crucial step that needs to be taken. IPD is build on trust and willingness to change the old habits into new fresh ways of doing things. It can take time to find optimal partners to collaborate with, however, it is the key requirement. Moreover, attitude within the team makes a big difference. The Value Proposition step helps to understand whether all team players share the same values and goals. Once defined, the project goals are recorded in the Project Value Proposition document. Depending on the size and purpose of the project, the Governing Structure needs to be defined to set the boundaries and leadership. It is necessary to know who has the authority to do certain things in order to make the project go further.

During the Team Alignment Workshop, the parties discuss their scope of work. They break the project down into separate phases, define tasks and decide who is responsible for them. The Task Matrix is developed as one of the core documents of the future IFOA. Also, the Dispute Resolution Guide is proposed to make sure that when problem arise parties know the procedures that follow. The IFOA is drafted based on conclusions of previous steps and ICL is defined in the step of Risk and Incentive Session. The Incentive Plan is developed and attempts to stimulate parties to better performance. With the vision of fairly divided benefits and guarantees it is much easier to agree on contract.

In the final step all results and outcomes emerged from the initiation process are analysed and any other topics are discussed during the Gap Analysis. All this information is gathered together and Implementation plan for IPD adoption is issued. The whole process can take 60 to 120 days according to the expertise of Duke et al. (2010). However, the IPD Initiation Process is where true value is created for the owner and a path to success is developed. Therefore, it is crucial not to underestimate this phase and make it right.

Multi-party agreement derives from the Initiation Process and provides sort of a constitution for the consortium. The aim of the agreement is to set boundaries, define responsibilities and offer flexible roadmap to problem solving. The incentive compensation layer creates a buffer zone that stimulates parties for better performance through risk and benefit sharing. The IPD Agreement intends to serve as a project manual and guideline instead of a list of conditions and threats. Therefore, partners are more open to step in to the collaborative environment without a fear of risking things they cannot control.

Case Study

4 Case description

This chapter presents a Case Study of an existing consortium of companies (Development) and introduces all key contracting parties, their workflow, organisational structures and current projects. The company prefers to keep its identity confidential and to stay anonymous in this paper.

The Development is interested in the collaborative way of working and attempts to lead two of its current projects in a joint manner. Therefore, the organisational structure, workflow and projects need to be described in order to understand the problems related to processes.

At first, values, goals and organisational layout are presented; the contracting parties are introduced and their role in the project delivery is explained. In order to understand the complexity of the workflow two of the current projects are described. Workflow schemas of current processes regarding the project management are illustrated in Chapter 5 of this section .

4.1 Introduction

The RED company was founded in 2012 with the purpose of developing city through architecture and close collaboration of professionals in construction industry on private real estate development projects in Prague, CZ.

An Independent Investor (Sponsor) initiated the first impulse with the idea that was born in his brain after close collaboration with his Architect for more than 20 years. The Architect has designed several private residences of the Sponsor and has become his exclusive architect. A story that every architect would dream for – to meet a client that understands your perception of architecture and space and is willing to trust your guts in all aspects. Previous experience and collaboration has led them to start something bigger and prove that high quality architecture can be built on a larger scale in the heart of historical centre of Prague.

With this idea they approached a co-founder of a brand new construction company (Partner) to become their partner and General Contractor (GC) of their projects. Furthermore, the Sponsor (P1) and the Partner (P2) founded the Real Estate Development (RED) company that acts as a mediator between the Architect and the GC and oversees the project from the start till the completion and through out the maintenance phase.

This is how **Development** was conceived by bringing the Architect, the GC and the Sponsor in the same ballpark and setting the goals of proving that this project delivery layout can work and can diminish the disputes and egocentrism that grow in construction industry.

At the start, the legal structure of the Sponsor's companies needs to be established (Figure 8). The Mother ship (BV) is located in the Netherlands due to various advantages considering taxes and bookkeeping. **RED Group** is formed by several Czech affiliates of BV. Separate SPV is founded to finance each project without putting the entire firm at risk. These SPVs are 100% subsidiaries of BV and receive loans to finance each project.

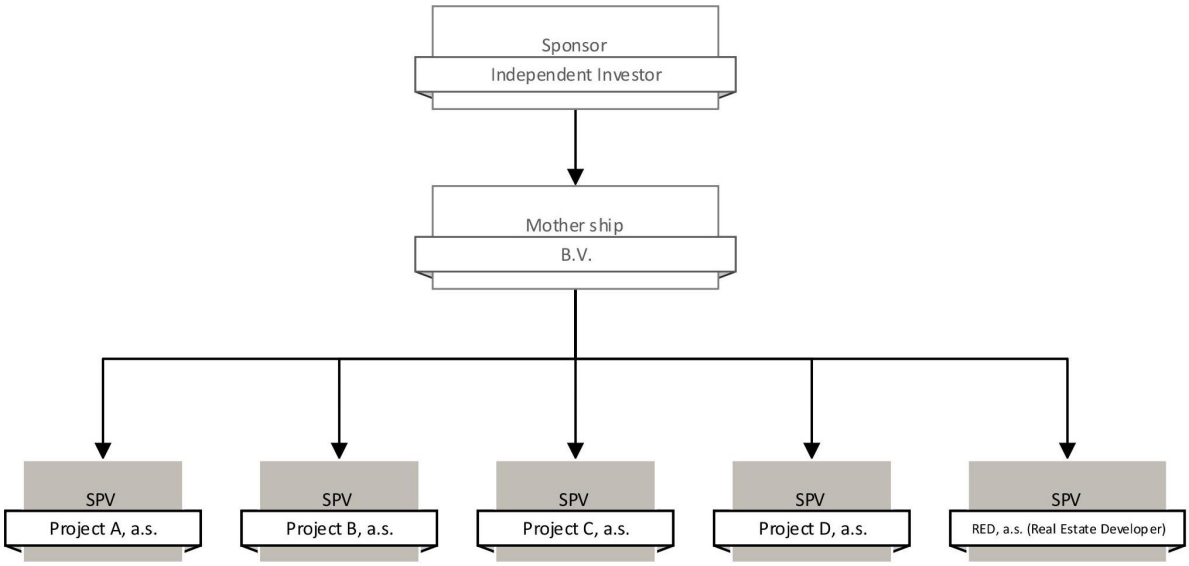

Figure 8: Ownership Structure

The structure of business activities is illustrated on Figure 9. RED acts as a cost centre and centralized service provider with respect to the provision of corporate services for other Czech affiliates of BV and as a practical interface between third parties and the project companies (other Czech affiliates BV). However, a large portion of performance, quality and risks are ultimately shifted to third parties (subcontractors). The project companies themselves largely assume the remaining risks. RED is assuming limited risks as the project related risks managed by RED are managed on behalf of the project companies (other Czech affiliates of BV).

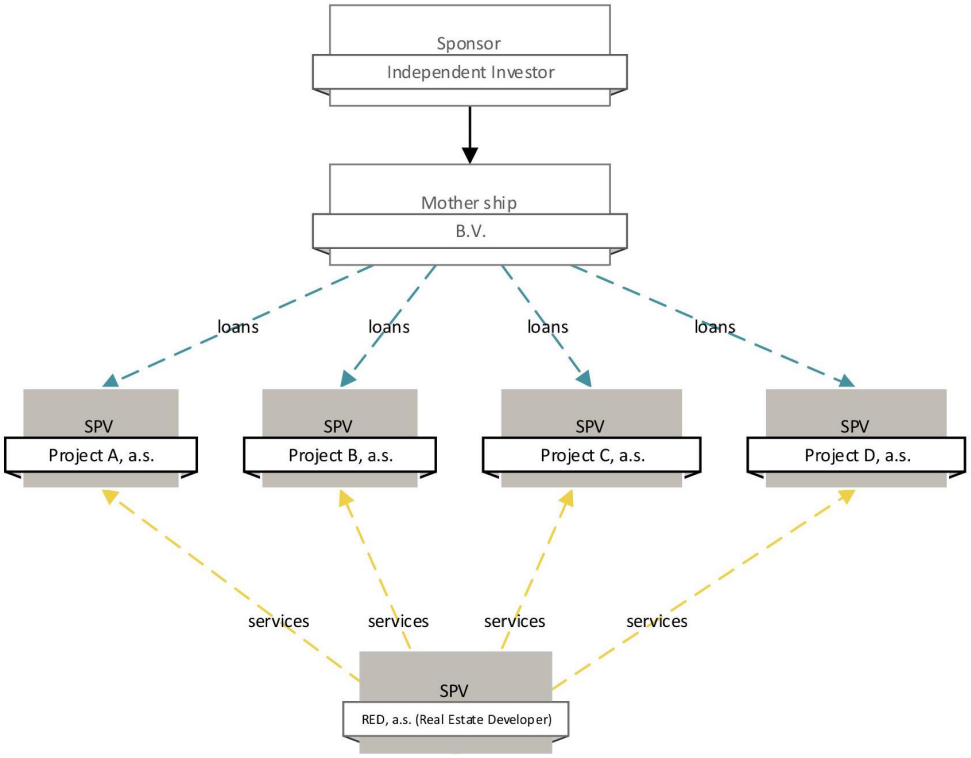

Figure 9: Business activities within the Group

Following chapters introduce the Development model as it is nowadays. The organisational structure and companies' profiles are described; other companies involved in the Development process and their roles are introduced. Detailed description of processes and workflow is provided and current projects are presented.

4.2 Development

As mentioned in the Introduction to this chapter, the concept is to build relationships in construction industry that will guarantee high quality project delivery through close collaboration and shared goal setting.

Figure 10 illustrates the contracting structure of the Development. RED is the binding element and coordinates the Architect and the GC. The goal is to work on one platform, however, since the Architect and the GC are not bind with a contract the key relationship has no boundaries or limits. Since most of the issues are reported to RED as the Sponsor's representative the responsibilities are mitigated to them and that causes work overload on RED's side.

In this schema it is evident that once more participants get involved and communicate only with one of the parties the key information can end up in one branch without the other branch noticing. This is the major issue that leads to many problems and therefore workflow process must be defined and followed by all.

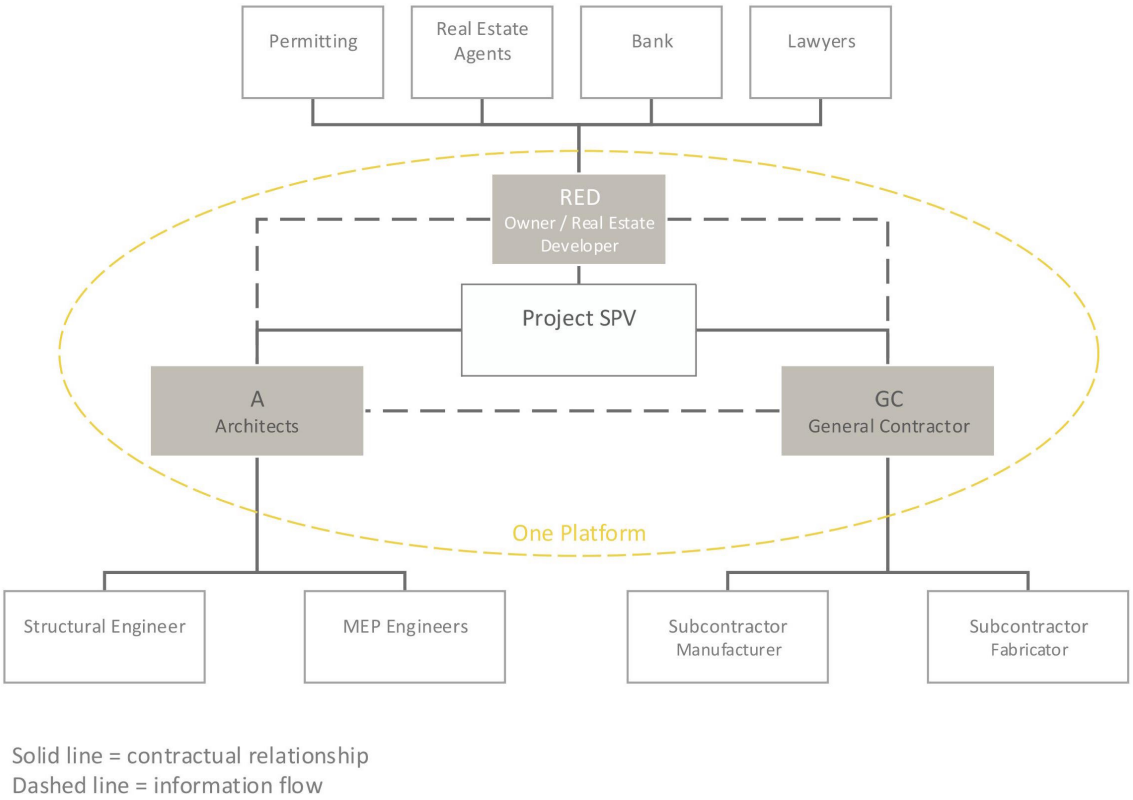

Figure 10: Contracting model of the Development

To define the process, it is necessary to get familiar with the way companies work now to learn what can be improved. Next chapters introduce key entities involved in the Development, their scope of work, personnel situation or tools they use.

4.3 Profiles of companies

4.3.1 Real Estate Developer

Mission

The core business activity of the RED Group is the investment into real estate in the Czech Republic, with the main focus on office, retail and residential investments.

Scope of work

RED and its subsidiaries protect the Sponsor's interests and act as a mediator, controller, consultant or real estate manager. One of the main tasks is to coordinate professions and make sure that everything is done on time and following the given budget. Once the projects are completed, the goal is to take over the role of a facility manager as well. RED is also looking for future tenants, negotiating with them and presenting the future premises to them.

The scope of work is fairly wide and involves not only negotiation with well-informed construction professionals such as Architects or Contractors but also with Clients who very often do not know what their expectations and requirements are. As in every field, lawyers are involved in construction process, especially when lease agreements are negotiated. RED and its external law consultants are the one who prepare contracts and negotiate with Clients' lawyers. If there is a need for any other contractual process that does not necessarily belongs to the responsibility package of Contractors/Architects, then RED makes sure that these contracts are ready and signed in time.

Last but not least, permitting is in the hands of the Sponsor's department. So far, with the two projects that are described in detail below, external engineering firms were hired to help RED obtain all the permits needed for the construction to begin. Since both of the projects are located in the historical centre of Prague, the process of permitting gets very complicated, especially when the architecture gets ambitious and modern looking. Therefore, RED engaged engineering consultants that have experience with permitting in Prague 1 (historical centre). However, the whole procedure of acquiring zoning/building permits needs to be coordinated with the Architects and Contractors and that is again a responsibility of RED people to make sure everything is harmonized.

Personnel / Organizational structure

On Figure 11 the organisational structure of RED is illustrated. As can be seen, the team is fairly small. As for now, the team consists just of 6 high-skilled people that are overwhelmed with two complex projects that are currently in progress. Their constant

effort to make things work in time and budget is escalating as the projects grow into more complex phases. Of course, many unpredictable situations occur and there is no manual to take a look at.

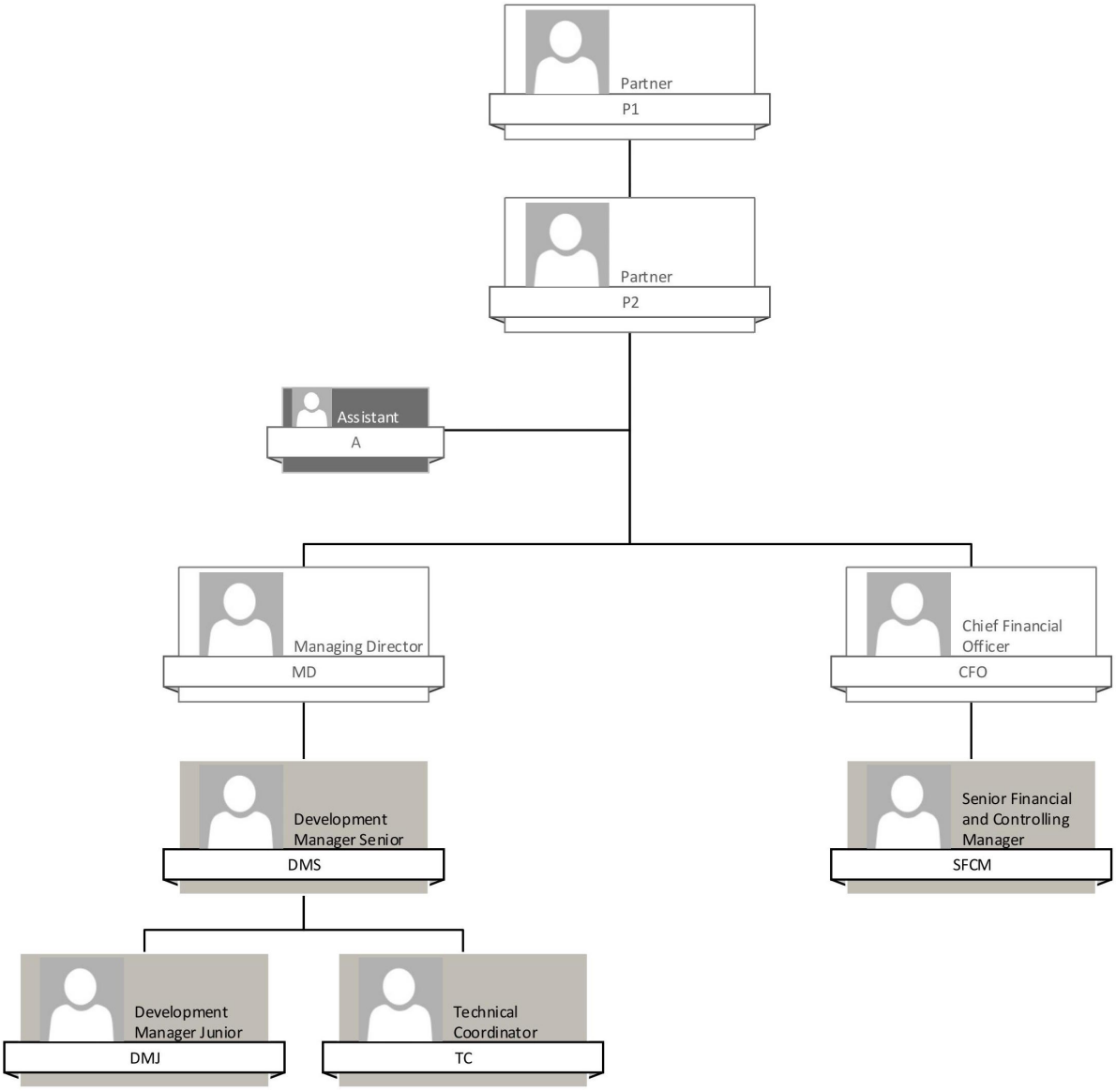

Figure 11: RED's organisational structure

Tools

RED is mainly focused on the managerial, organisational and contractual part of the process. The main task is to coordinate parties, archive documents and to generate reports or contracts.

So far, these are the tools being used in the process:

- Microsoft Office - Excel, Word, PowerPoint, Outlook

- Google Drive
- AutoCAD – for comments on project documentation, commercial planning

Although very often the RED's Project Managers comment on the project documentation and need to make revisions. Therefore, BIM tools that make this whole process easier and help determine clashes would be more than appreciated. Also, a tool that would make information transfer / assignment more efficient than email client would be very helpful.

Contracts

Currently, RED's main contracts are with the General Contractor and the Architect. The contract with GC is based on cost plus fixed fee method, which is very convenient for GC. The contract with Architects is based on fixed price depending on the level of documentation.

RED, since it is on the Sponsor's side, often signs contracts with potential Tenants, Real Estate Agents, Lawyers, Neighbours (neighbouring the project's premises), Service providers, etc.

Projects

RED is currently developing five different projects in Prague, CZ. So far, two of them are in the construction phase, other two are still in the process of obtaining zoning/building permits and the fifth one is still in the pre-design phase. Separate SPVs were founded to the purpose of each project and carry the name of the project in the name of the SPV.

Chapter 4.4 introduces two of the projects that are currently being built. These two projects are now under construction and are the main focus for all participants in the process. The same Architectural office designed all of the projects.

4.3.2 Architect

Introduction

All design ideas are born and manufactured within the team of the Architect. The collaboration with this particular architectural office is the key requirement and meets RED's perception of urban space, approaches to its development and conception of houses that sensibly tie in with the context in which they emerge.

The architectural office has been wedded to RED since the start of its operations, and in every subsequent project they and the Architect draw on the experience acquired during the creative process as well as in deliberations with the authorities and other parties involved in transforming the city. This longstanding personal and professional dialogue with a single architect is also reflected in the elaboration of the houses they create together.

Typical of the Architect's work is for his new houses to tie in with the space in which they emerge without engaging in historicizing or regressive enterprises. The magic of his structures consists in a meeting of the new and the original with a clear attempt to create a space that will inspire and – in the best sense of the word – surprise its residents.

Personnel / Organizational structure

The team of architects is rather young and counts 11 people all together. The lead role in all the projects (and eventually in the whole consortium) belongs to the Lead Architect (LA). Thanks to his long-term relationship with the Sponsor, the owner and partner in RED, he has built a strategic position in the hierarchy and the Sponsor respects and supports all his ideas.

Another key role belongs to the Senior Chief Engineer (SCE). Expert in technical manners whose long-time experience is holding the team above the water level guards this position. He is the key person communicating mainly with RED and GC, explaining and defending changes in projects. However, no matter how experienced SCE is, it is a big bite since the projects are very complicated and it is rather challenge to keep up with all the change orders. As can be seen on Figure 12, he is managing the design process of both of the current projects (with a little help of Junior Chief Engineer (JCE) in Project A).

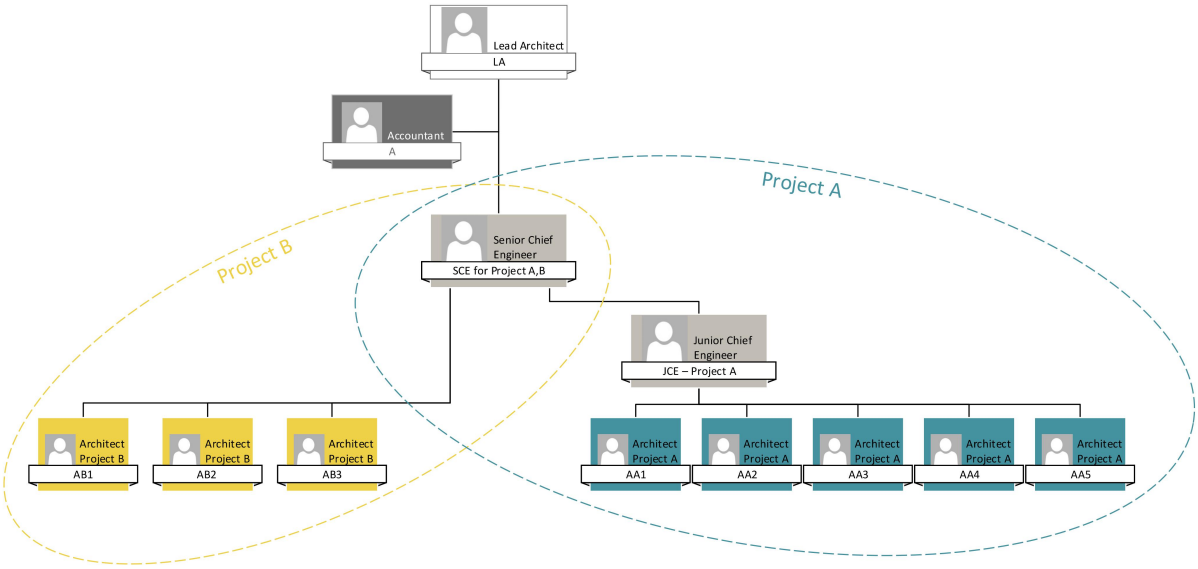

Figure 12: Organisational structure of the Architectural office

The rest of the team consists of young architects that are recording LA's ideas and putting them on the paper. They are divided into separate teams according to the project they work on and their main task is to deliver the project documentation on time. They also communicate with external partners like structural or MEP engineers. Their role can be described as Draftsmen mainly, they have to report to LA and get his approval every time.

That is in many cases the reason why documentation is not finished on time because they cannot make the final call.

Tools

- AutoCAD – 2D drawings
- Google Drive – to share data with RED, GC
- Microsoft Office – reports, administration
- SketchUp – for visualization purposes
- Adobe Photoshop – for visualization purposes, commercial plans

4.3.3 General Contractor

Introduction

The construction company was founded by graduates of one of the biggest construction firms in the Czech Republic. After they gained enough of experience on large and complex projects they decided to start their own business and become a competitor of their alma mater on the Czech market. Their goal is to ensure top quality construction, while maintaining a highly personal approach to their clients.

Their scope of work includes:

- Office buildings
- Commercial buildings
- Apartment buildings
- Plants and warehouses
- Special foundation
- Monolithic reinforced concrete construction

Their role in the construction project is often as a General Contractor (GC), however, they select Subcontractors for 99% of the work on the project. GC performs all the scheduling, estimating and bidding in the process.
These are some of the areas of GC's focus:

- Recommendations regarding choice of material; specialized delivery; consistent work supervision; clear construction grounds as well as a well looked after surrounding area;
- Customer-focused approach – quality construction bidding; value engineering – the reduction of costs while preserving the architectural and functional parameters; a professional open minded team on site

Personnel

The company is still on its start, although they have already completed several projects. The team is still growing and lacking personnel, the same as the two previously mentioned companies.

GC often forms project teams that are located on the building site and manage the construction from there. The two projects described bellow are managed by two teams, however, the personnel often move from one project to another, depending on where it is needed the most. That leads to inconsistency, loss of information or confusion.

Tools

- Microsoft Office
- AutoCAD
- Google Drive
- MS Project

4.3.4 Other

Among the other professionals that are subcontracted by Architect are of course Structural engineers, Building Physics consultants or Timber structures specialists. Both of the projects that are introduced in next chapters engage modern architecture and historical heritage. Therefore, close collaboration with restorers is needed as well. RED is in the Owner's position and therefore cooperate with Banks, Real Estate Agents, Potential Clients / Tenants, Lawyers and others. GC is in charge of selecting, closing contracts and managing subcontractors or fabricators.

4.4 Current projects

For better understanding of the level of complexity two of the current projects developed by Development are presented in this chapter. Both of the projects are situated in an easily accessible location in the historical centre of Prague with a great connectivity to all means of public transport as well as the road connection to arterial inner ring road.

The location supports their intended use as office buildings with retail space on the ground floors. Moreover, currently in Prague 1, there are not known any new construction projects of larger character in the office area scheduled for completion in 2016-2018. It can be assumed that both Project A and Project B will be coming to the market in the right time assuming that majority of the existing premises will be leased till then since there is a constant demand for office premises in the centre of Prague.

Both of the projects obtained valid zoning and building permit. The buildings have been designed to comply with Czech building standards and regulations. Since both of the projects consist of historical building, the design is reflecting the preservation of the historical monuments and meeting the standards for new anticipated use of the building.

4.4.1 Project A

Project A offers very unique atmosphere of historical palace. The building itself is in a good physical state since it was under an operation and maintenance through the time by various institutions. In order to accommodate current needs arising from its intended use as office building with retail component on the street level the building will need to undergo a reconstruction that will restore its historic charm while reflecting the provisions accommodating new functionality. The building is accessible from three different locations/streets and that creates great potential for its intended use as office building with retail space on the ground floor and partially in the basement.

Property Description

The Building is situated on land area of approximately 2 000 sqm, all with freehold title held by RED's development SPV. Part of the building is listed as historical monument.

Building Description

Project A is formed by 2 buildings (A, B) that area connected through corridors in the inner yards and in the basement. This structure allows to create variety of potential leasable space ranging from 400 sqm – 1250 sqm on one level as well as to divide building vertically.

Building A features 3 underground and 7 aboveground floors and building B features 3 underground and 5 aboveground floors. The structure of building B will be modified during the renovation and instead of 3 underground floors there will be 2, both building will be connected and 2 more floors will be added above the 4^{th} floor of building B.

Technical Specifications

The reconstruction will mainly focus on building services in order to secure comfort for the office and retail use. All the building finishes will be restored or there will be new finishes applied based on the architectural design meeting the higher standard criteria in terms of design as well as quality and durability.

Development & Leasing Strategy

The Development plan considers the building offering office spaces in the aboveground floors from the 1st floor up and retail spaces in the 1st and 2nd basement and ground floor with independent entrances directly from the street. Project A is very flexible in terms of size of independent premises per floor.

4.4.2 Project B

Project B is situated on one of the high streets of Prague and once completed it will offer very unique atmosphere created by newly build green building connected to historical palace offering precious historical features such as wooden structures, decorations etc.

In order to accommodate current needs arising from its intended use as office building with retail component on the street level the building will need to undergo a reconstruction that will restore its historic charm while ensuring the full operation of the building when meeting the current requirements of potential tenants on quality and space requirement.

Property Description

The Building is situated on land area of approximately 2 200 sqm, all with freehold title held by RED's development SPV. The property was composed of an empty lot and an old palace that is listed as historical monument.

Building Description

The project is formed by 2 buildings – historical palace and newly built building with underground parking. The buildings are interconnected on all levels. There is a passage through the new building into inner yard that will further be connected to adjacent building.

The historical palace will be restored to its late renaissance and baroque appearance featuring all the historical art works such as painted wooden ceilings and walls. The layout of the building will allow to accommodate very high standard enclosed offices or to be an integrated part of the newly build adjacent building providing enclosed offices or representative meeting rooms.

The newly build building will be the first and only green building in Prague city centre offering to its clients the benefit of green terrace on the perimeter of the building. The building has 4 underground parking levels and 8 above ground levels with the main reception on the ground floor from the high street. The building will feature state of art building system such as cooling ceilings, alternative sources of energy etc.

Technical specification

Renovation will mainly focus on technical equipment securing the building comfort for office and retail space utilization. Any alterations will be renewed or new adjustments will be made based on the architectural design facing higher standards both in design and in the quality and durability.

Development & Leasing strategy

Project B presents unique and representative building that can serve as a regional HQ building for a single tenant as well as multitenant building offering areas from 800 to 1500 sqm per floor.

4.5 Summary

The current setting of the Development was explained to understand the way projects are managed and delivered, which parties participate and what their organisational structure looks like. To comprehend how challenging the situation is on-going projects were presented. Both of the projects are a combination of new development and retrofitting of a historical building. This fact brings many *whys* and *what ifs* that need to be solved.

The RED company works as a binding element in the whole process, sort of a Project Manager / Consultant. They make sure projects are running on time and budget by double-checking with the GC and Architects and assigning relevant tasks to each party. RED is legally the Owner of the properties and represents the Sponsor and his interests.

The key personality in the whole Development consortium is the Lead Architect. The Sponsor's trust in his abilities, ideas, knowledge or feelings is enormous. In fact, this whole development idea became real due to their long-term relationship and cooperation. The personality of LA is very strong and cannot be imprisoned in a system. The organic approach to problems is essential in order to be trusted and respected by the LA. Therefore, the final proposal of improvements must consider this challenge as the key condition.

The project delivery method can be defined as a combination of traditional DBB (Design Bid Build) method, CMAA (Construction Manager as an Owner's Agent) and IPD (Integrated Project Delivery). Nevertheless, there are very low indications of integration and collaboration. Apart from having "one Owner / Sponsor" there are no signs of shared goals, risks or incentives, no multi-party agreement.

5 Case workflow analysis

In order to successfully propose improvements and guidance for BIM and IPD adoption it is necessary to understand current processes of the Development and issues related to their workflow or tools usage. Therefore, detailed workflow schemas are presented and analysed. Since projects described in Chapter 4.4 are in the construction phase already, schemas of processes that occur during this phase are described.

Methodology

Business Process Modelling Notation (BPMN) workflow diagram technique provides a graphical notation for business processes. With this method we are capable to understand the internal business procedures such as the communication process and describe information exchange or content of the exchanged message.

5.1 Process analysis

5.1.1 Design Development (Figure 13)

The Design development schema illustrates the design process generally; it can also be applied to the conceptual design at the start of the project or during the construction phase while details are being designed. Four parts of the process are indicated to cause problems.

First of them (issue 1) is identified at the start of the design process and refers to the Lead Architect who sketches the conceptual design. This step is quite common and LAs often design the concept. However, in this particular case, LA demands to be the owner of the design and no changes are allowed without his permission. This fact causes trouble when the project is already in the construction phase and the Architects / Draftsmen have no competences to step in and be responsible for the design. Nevertheless, this is the case for many architectural offices where the Lead Architect is the head of the design.

The next problem is represented by the fact that every change to the design has to be approved by the LA (issues 2 and 3). According to this, the project is getting into time and high cost issues. This is one of the main issues that occur during the project design and unfortunately have negative impact on all following processes. When the conceptual design is not finished the structural design cannot be completed, documentation cannot be handed to GC and the tender process cannot launch.

Another problem (issue 4) detected in the process relates to the lack of Building Information model. The architectural team uses AutoCAD only. Considering the high number of change orders BIM would provide an efficient design method that would help to discover clashes earlier and prevent decent amount of change requests.

5.1.2 Problem Solving Process (Figure 14)

Construction Documents are finished late, often just before tendering. Due to this fact GC usually discovers mistakes in project documentation when preparing the tender documentation. Depending on the scale/impact of the issue he informs either the Architect or the RED. There are no rules on who should be informed first and therefore problems are being solved and design changed without parties knowing about it. This causes information loss and often much rework. Plus, all this information is provided by email / phone call or random meetings which creates chaos and disorder.

5.1.3 Change orders (Figure 15)

The problem with change orders starts with the fact that there are too many of them and most of them are proposed by LA. The next issue is that RED usually has to agree with the change order again due to the status of LA in the whole process. Since the projects are in construction phase there is no time for change orders so this has to do with a lot of redo and high costs. Also, due to very close relationship of LA and Sponsor some requirements can be changed without informing RED about that change. This happens rarely but when it occurs it has significant impact on the information losses.

5.1.4 Tendering (Figure 16)

Construction Documents (CDs) are not finished on time and therefore GC cannot start tendering. Following the previous paragraph, another issue is related to the change orders that happen too often and GC therefore needs to inform the bidding subcontractors about the change and they need to change the bid documents. This leads to mistrust from Subcontractors' side and anger on GC side.

Another problem is the lack of personnel in GC's project team. Since both of the projects are complicated and many change orders are issued the communication with potential or already selected subcontractors is crucial. Considering the fact that Architects often hand over CDs without Bill of Quantities (BoQ) there is an urgent need for estimators and preparers.

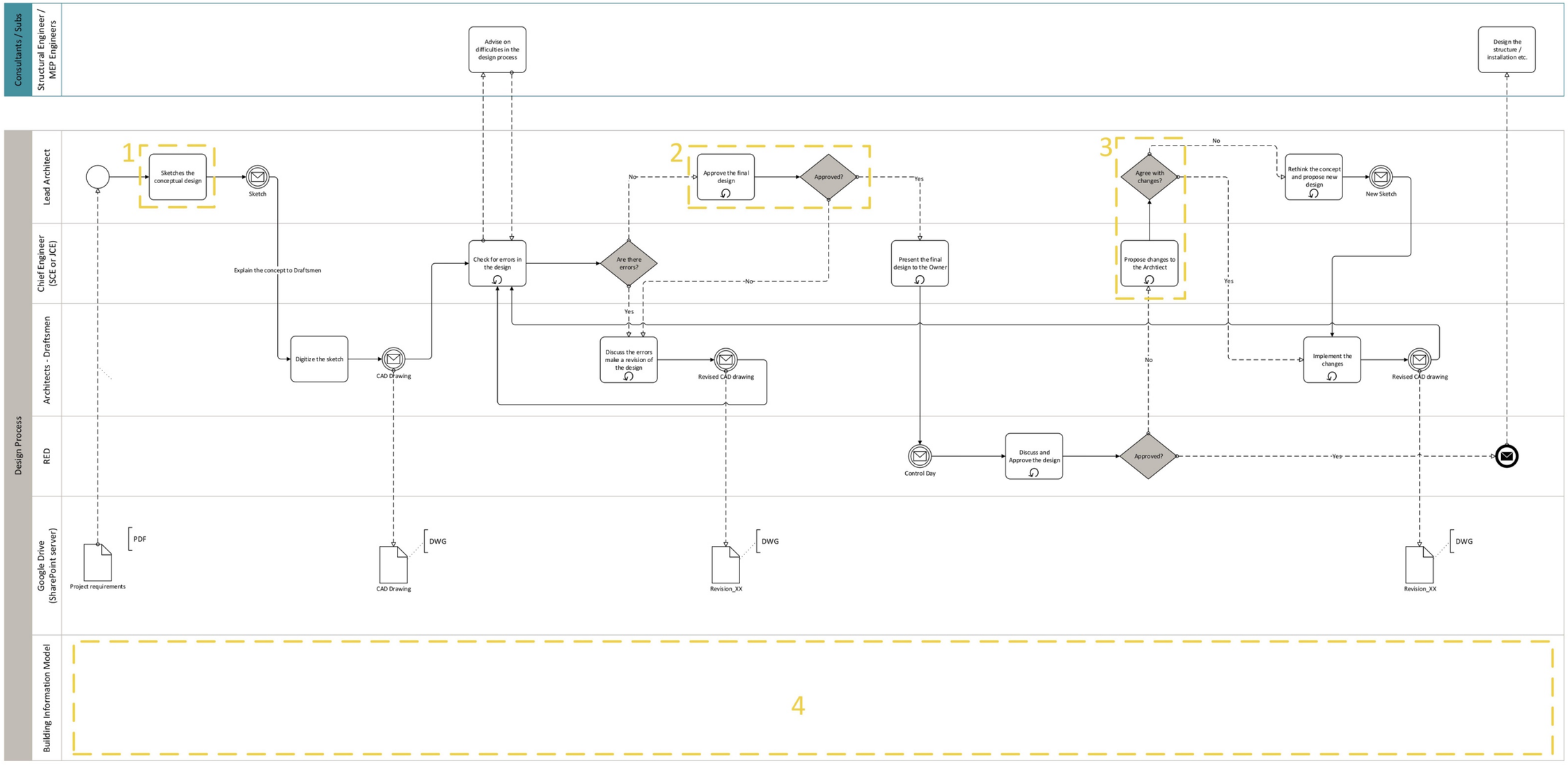

Figure 13: Design development

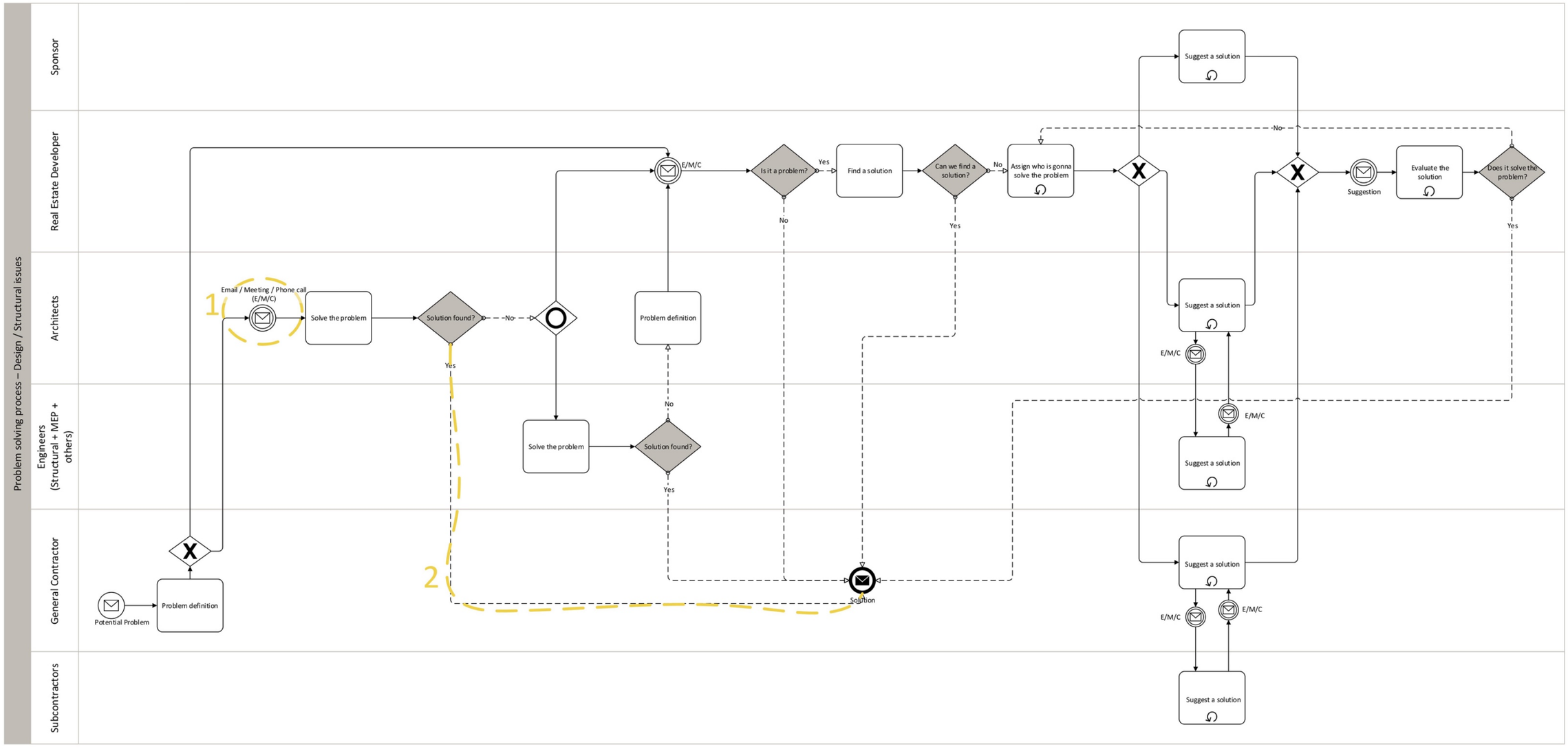

Figure 14: Problem Solving Process during Design Development

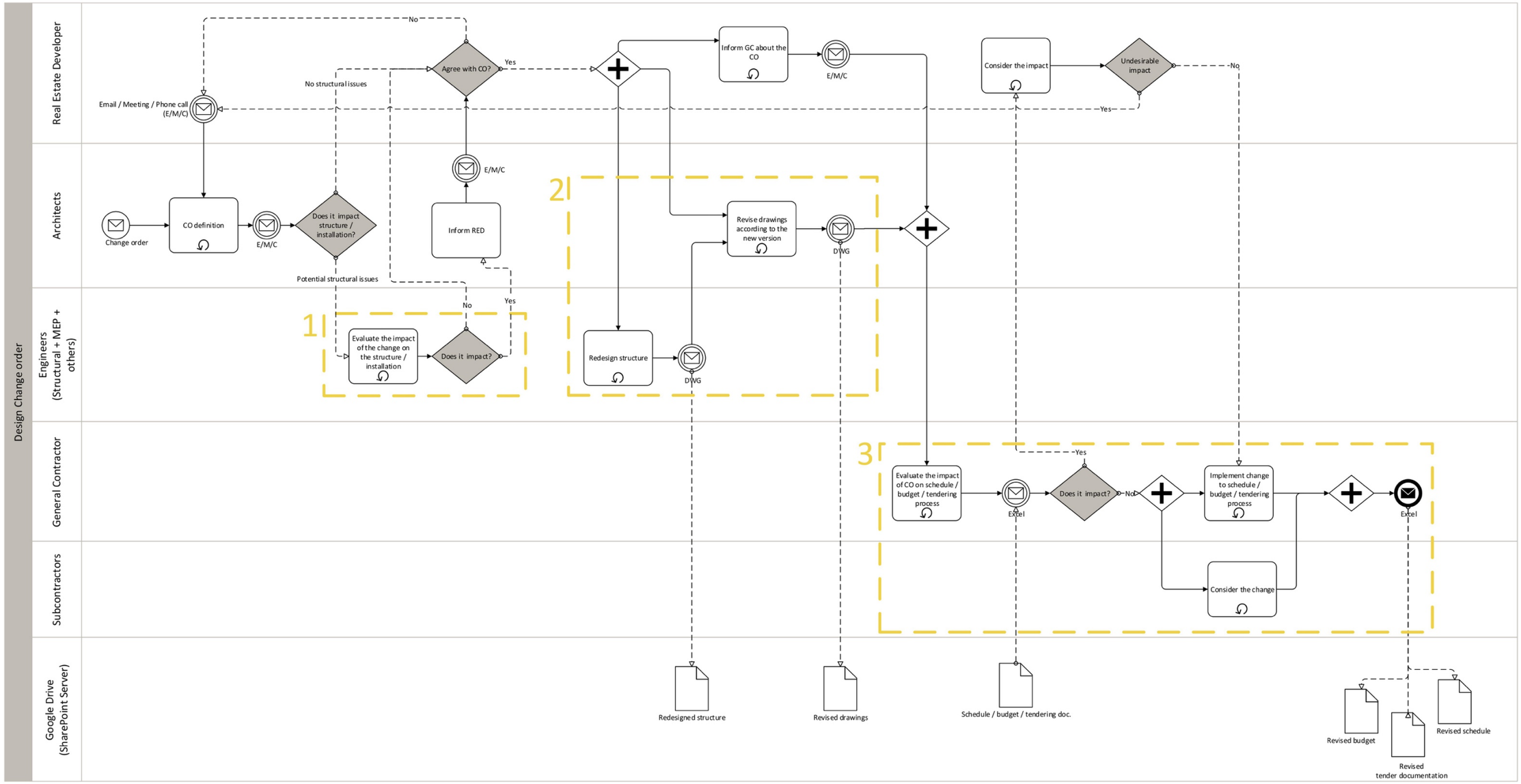

Figure 15: Design Change Order

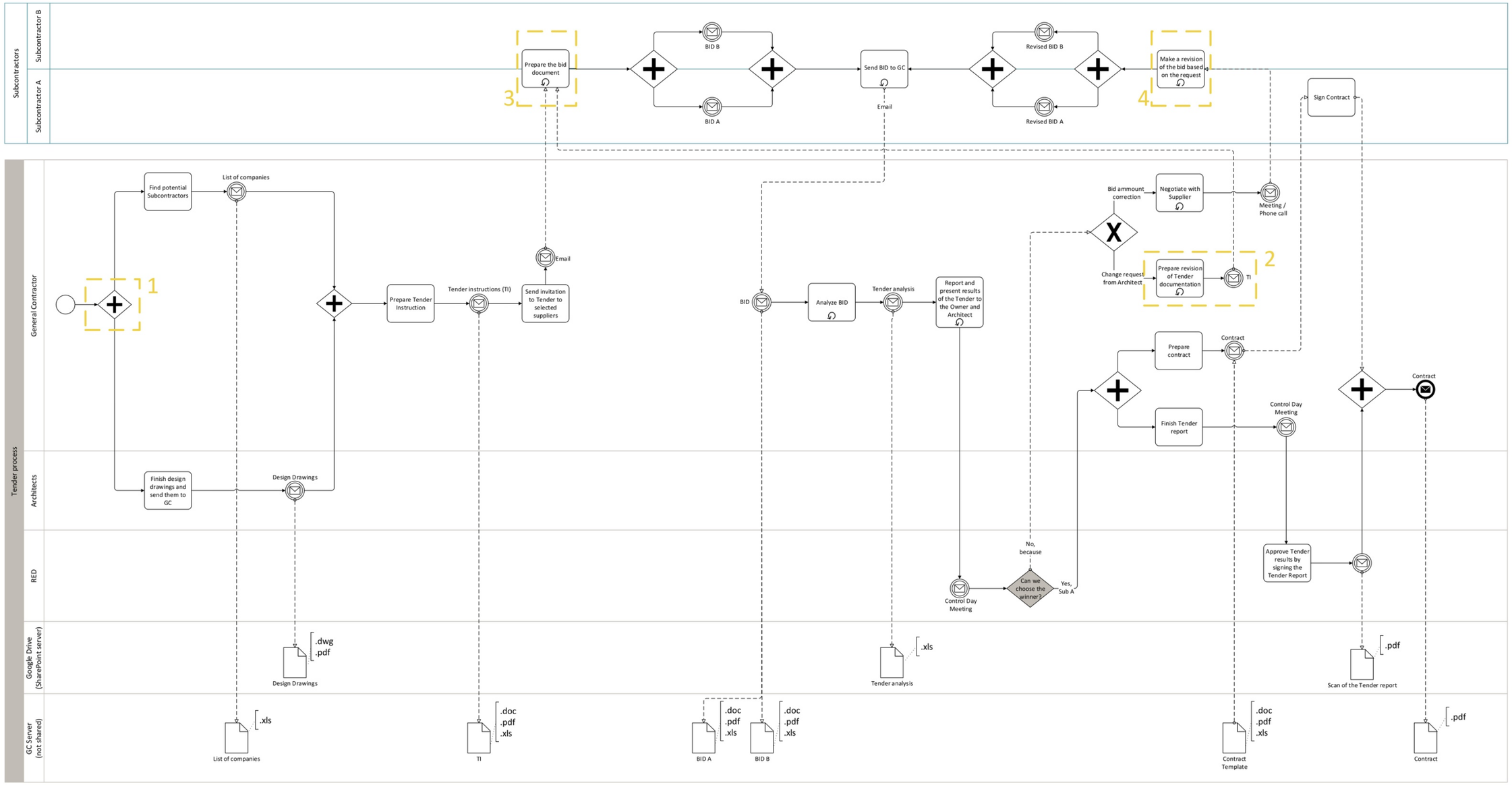

Figure 16: Tendering

5.2 Key problems indication

After the analysis of key processes three problematic areas are defined. These three areas are listed bellow with a brief description. However, it is not only about fixing the detected issues in the processes themselves but more about looking at the problem from further perspective; solving issues in the system as a whole. One key condition that has to be maintained is the role of the Lead Architect. The Lead Architect is the head of the design and he is the most organic factor in the process. Despite the fact that he is hard to manage he truly is the success indicator of the Development. Therefore, it is necessary to provide freedom to LA and subconsciously stimulate his work to be more productive.

Organic leadership with not much of a structure/planning

One of the main challenges is the fact that the Development is growing organically. Owners and top management personnel were tired of structures, rules and roles that they had to experience during their career lives. They decided to build a business based on trust, friendship and goal sharing. However, no one is maintaining the motivation, these is no leader.

One of the Partners promotes following: “Be the leader yourself, do what you think is the best, I trust you.” With no doubts, trust and freedom in decision making is crucial. Especially when you want to work in an integrated project. On the other hand, all of those who are in charge of these decisions have to follow the same code. All of them have to be aware of the shared goals, rewards and risks. In this case, the goals are defined very vaguely and not all the parties are aware of the impact (positive or negative) of their decisions on the project success.

Integrated project delivery principles and methods provide answers to these issues. There are several steps that participants of an IPD project have to go through to define goals of the project and to create structure in the decision making processes. Guidance to IPD implementation process that can lead to more integrated environment is provided in Chapter 6.

Poor role definition

Poor role definition is one of the biggest problems and leads to the next listed issue which is information loss. It is truly a challenge to keep up with all the new information, try to solve problems, delegate them and make sure that everyone is doing their job. However, that is the problem going on in this Development. People work on more projects in the same time and responsibilities are not mitigated adequately. Also, not having a detailed plan and organisational schema brings more confusion. It leads to the stage where everyone can do anything anytime.

Information management

Following two previously described issues it is no surprise that both of them lead to information loss. This issue however is occurring all across the industries, in every day's life of every one around the world. There is so much to understand and solve. More people equals more opinions and more variables for discussion and dispute. Also, with modern technologies and tools it is much easier to share knowledge and information and it leads to information overload. The result is that people possess with an enormous amount of random information and it is rather a challenge to put the pieces together.

Nevertheless, having a structure for information sharing be the solution. Modern software tools can also be an advantage and can increase productivity if used properly. The solution can be found simply by deciding how to communicate and setting up rules among parties and disciplines that need to be followed in order to share information efficiently.

5.3 Conclusions

All the above listed problems are related to the fact that there is not much of a structure and organizational rules and mainly – no real motivator. However, the Lead Architect has the key role. He is highly respectable and represents the success indicator in the whole Development. As proved on many already finished projects designed by him, the end result is always very satisfying and thought through to small details. Nevertheless, we have to keep in mind that the scale, purpose and level of complexity of these completed projects was different at that time. Also, these projects had mainly private character. The two current projects (Chapter 4.4) are a combination of new development and retrofitting in the historical centre of Prague. Moreover, these are commercial projects and the goal is to rent the premises and make a profit.

The whole idea to start this Development was based on great relationships, trust and desire to prove that even larger projects can be executed in this atmosphere. This is the fact that has to be considered as the key condition. However, even the friendly environment needs some form of organization structure and rules. The BIM and IPD Implementation section presents ideas on what has to be improved and adapted to increase productivity.

5.4 Discussion

“Develop city through architecture and design” is what the RED promotes. It is important to understand that the whole development idea is based on a long-term cooperation of the Sponsor and the Lead Architect. Therefore, this approach is more likely to be accepted by all parties than trying to change the Architect. There are benefits but also risks related to this path.
One of the main benefits is the fact that the Architect can work the way that is natural for him and therefore the quality of the architecture is not downgraded by restrictions or limitations. On the other hand, this can also represent a risk. Balanced schema has to be developed to guarantee success or at least improvement of the workflow.

Risks related to this approach can be hidden in the number of competences of LA. The more freedom Architect has the riskier it can be. There is always something that needs to be improved, redesigned or eliminated. The final design is never perfect. This can lead to endless change orders. Limits have to be defined to all parties, including the LA.

IPD Implementation

6 IPD adoption

Regarding the Case Study of the Development, the process analysis and revealed issues within the delivery of current projects, this section aims to solve detected problems by building up on ideas of IPD approach and BIM tools implementation. These ideas and specific steps for their implementation are described in the Literature Review section. In this section, the ideas are implemented to the processes of the Development to demonstrate their impact on the delivery of current projects.

Beforehand, key findings about the Development are illustrated on Figure 17. The graphic indicates what each party is responsible for, which areas are affected by their work and what their motives are. Naturally, as each party specialization is slightly different, terms differ in each bubble. However, intersections in interests must be found if one platform concept and collaboration are hyped.

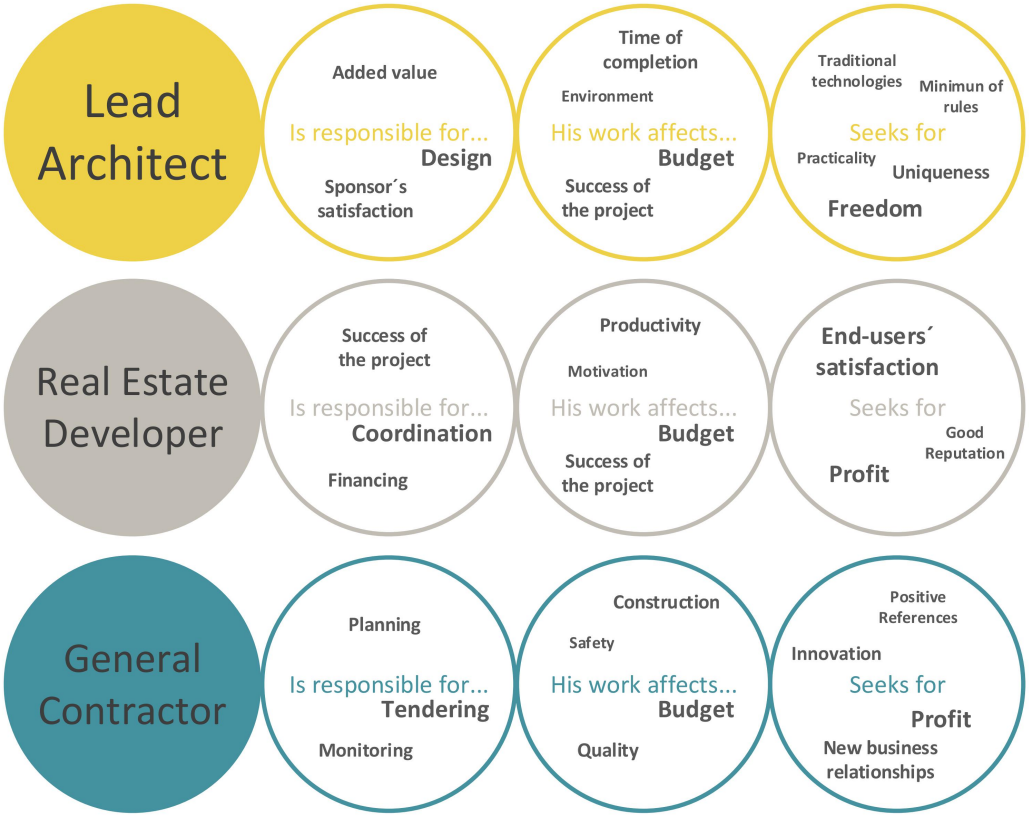

Figure 17: Key findings

Parties have to understand each others' importance in the project and how they can contribute to each others' work. It may sound very basic but it is a crucial to realize these facts. Following challenge is maintaining the spirit and constantly reminding the *Why?*

factor. However, these are philosophical aspects, theories that lay behind. To make a difference it is important to take real steps to verify these hypotheses.

It is crucial to limit time and effort focusing on the companies themselves and instead turning the inner balance into the project delivery balance. Some say that too much of management brings complexity to the process (Shen et al., 2009). In the end, the successful project is the indicator of all parties' high performance.

In Chapter 5.2 three areas were detected to be the most crucial for improvement – Leadership, Role definition and Information management. Since these areas are mainly related to managerial settings, IPD presents feasible solution for these issues considering the ambition of collaboration of all parties. This chapter outlines the template of the Multi-party agreement based on of the contract templates that are available for IPD projects (Chapter 3.2.1) and the impact of these contractual changes on the workflow.

Following the steps presented in Chapter 3.1, we can outline the structure of the IPD Agreement for the Development. Starting with Team Creation and Value Proposition the mind-set among parties is established. Once Governing structure is defined the Team Alignment Workshop launches. Dispute resolution guide and Contract task matrix are the key outcomes of the workshop. Next, Risk and Incentive session contributes to final IFOA Draft elaboration.

Proposed structure of the IPD Agreement is presented in Chapter 6.1 and in Chapter 6.2 the predicted improvements of the workflows are illustrated using updated BPMN schemas from the analysis (Chapter 5.1).

6.1 Agreement proposal

Based on the comparison of available contracts in Chapter 3.2.1, the structure of IFOA suitable for the Development's project is proposed in Table 9. The contractual model of HansonBridgett LLP aligns with the intentions of the Development and therefore the proposed structure's foundation is based on their IPD Agreement template. Furthermore, less layers and low complexity of the HansonBridgett's contract provides logical and readable layout which is desired.

The IPD Agreement consists of the Agreement Form and the Exhibits. The Agreement Form is the core part of the IPD agreement and defines general features of the integrated approach. The content of the Agreement Form remains nearly the same for different projects. The Exhibits provide more specific information often related to the uniqueness of each project. Also, Exhibits assist parties in their effort to collaborate.

To provide better understanding of the content of the Agreement templates are presented in the Appendix section. Template of the Agreement Form is enclosed in Appendix A and the template for Exhibits in Appendix B. The Agreement templates are adopted from HansonBridgett LLP (2010) and AIA (2009a). Legal advice is recommended before entering into agreement.

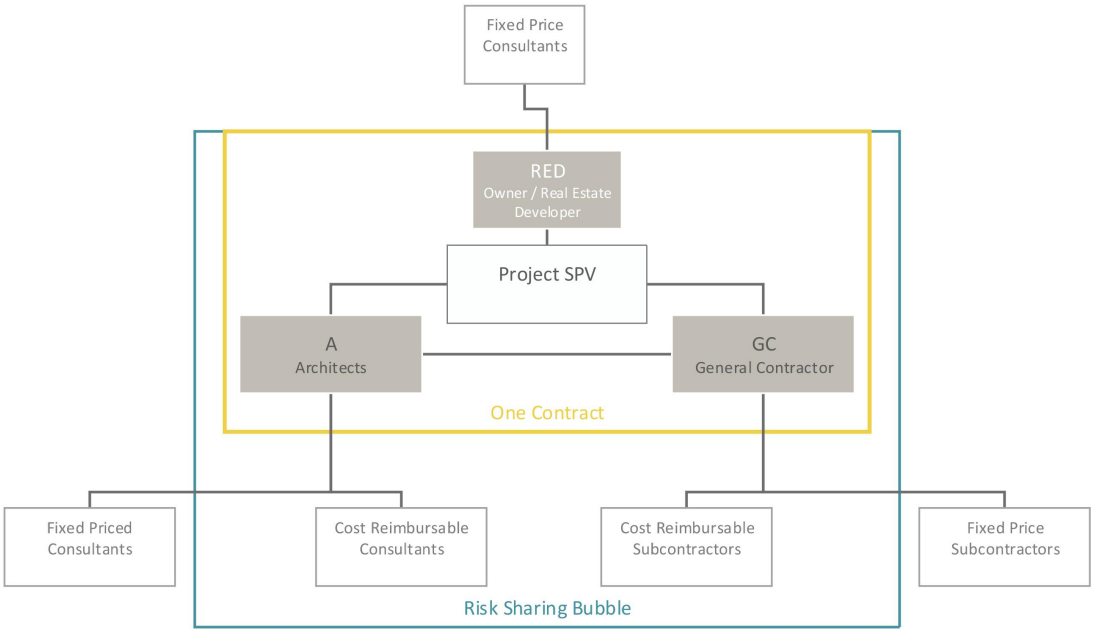

Figure 18: Updated organisational structure of the Development

The organisational structure of the Development evolves after the adoption of IPD Agreement and the updated schema is illustrated on Figure 18. One contract ties together the Owner, Architect and the General Contractor. The new agreement also proposes to involve the key subcontractors and consultants into the ICL (Cost Reimbursable Consultants & Subcontractors). Therefore, Structural and MEP Engineers or Key subcontractors have stake in the outcome.

Table 9: Proposed structure of the IPD Contract

AGREEMENT		Description
1	Definitions	Terms necessary to know to understand the Agreement are explained in Ex. A .
2	The Project and Relationship of the Parties	Defines the project and its objectives.
3	The Parties	Responsibilities of Key parties (A, GC and Owner) are presented in this section and their relationship is defined.
4	Project Management Team	Includes responsibilities of PMT, project meetings, decision making, parties representatives, senior management representatives, etc.
5	Project Implementation Team	Optional – responsible for designing and implementing the Project consistent with the Project Objective.
6	Award of Subcontracts and Consulting Agreements	Defines the tendering process, subcontracts and consultants agreement, liabilities of subcontractors/consultants and others.
7	Responsibilities by Phase	Responsibilities of each party regarding phases of the IPD project is defined in this section, often referencing to exhibits, esp. Ex. D.
8	Compensation	Referencing to Ex. F
9	Incentive Compensation Layer	Defines ICL Adjustments referring to Project Cost (under VTC or exceeding VTC), Schedule (Accelerated or Exceeded) and Quality rating. ICL is recorded in Ex. C
10	Payment	Defines different types of payments applicable during the Project, right to withhold, warranty of title, payment of subs/consultants, audit right or disputes.
11	Contract Time	Defines VTS, schedule slippage, permitted delays etc.
12	Change Orders	Defines Change Orders limitations and procedure.
13	Liability Allocation	Defines waiver of liability, excluded claims, insurance (Ex. G), indemnification of parties, site safety or joint defence approach.
14	Warranty	Defines Contractor's warranty.
15	Dispute Resolution	Defines Scope, Disputes, Notice, Mediation or Arbitration.
16	Default, Suspension and Termination	Defines options of contract termination or suspension.
17	Miscellaneous Provisions	Defines licenses, standard of care, governing law, no third party beneficiaries, etc.
EXHIBITS		
A	Definitions	Defines terms necessary to know to understand the Agreement.
B	Project Value Proposition	Defines Sponsor's criteria, Project definition and Project goals.
C	Project Objective and ICL	Project Objective defines the amount of VTC, substantial completion date, final completion date, dates of program report, drawings and files submission. ICL defines the base of ICL, Architect's percentage of the ICL and Contractor's percentage of the ICL.
D	Contract Task Matrix	Defines different types of responsibilities regarding specific tasks by phase.
E	Management Protocols	Defines PMT Work Plan, Cost Management Strategy, Staffing Plan and BIM Workflow Plan
F	Digital Data Protocol	Defines Digital Data sharing and transmitting rules, data formats and data content.
G	Allowable Costs	Defines Architect's Allowable Costs and Contractor's Allowable Costs
H	Insurance	Defines provisions applicable to all insurance, commercial general liability, automobile insurance policies, umbrella/excess policies, Contractor's insurance and Architect's insurance, Builder's risk insurance, Ancillary insurance
	General Conditions of the IPD Agreement	Defines project administration, joint site investigation, software, owner's separate consultants and contractors, inspections, non-conforming work, safety precautions and programs, protection of utilities and adjacent properties, permits and fees, hazardous materials, cleaning up and recycling, sustainability.

6.2 Workflow improvements

Updated BPMN schemas of previously analysed processes in Chapter 5.1 are presented in this chapter. After IPD is adopted, processes become more organized and clear. There is a definite but still flexible structure that follows the multiparty contract and its exhibits.

6.2.1 Design Development process

One of the key improvements that the IPD contract proposes is the governing structure that pursues the unanimous agreement of parties. As can be seen in the updated schema on Figure 19, the Lead Architect no longer makes the final call in the design process, however, he is one of the representatives of the IPD Team. Therefore, the space is given to him to defend his ideas and push them forward. If the Contract Task Matrix (Exhibit D of the contract) is completed properly, the task assignment becomes more transparent and clear. Also, the Digital Data Protocol provides a guidance on data sharing and defines paths to files. This can save a lot of time scanning through different files and email attachments to find the right document.

The last lane in the schema illustrates how BIM can enhance the design process. If BIM is adopted, many clashes and misalignments in the design can be detected before the meeting of the IPD Team and therefore the discussion can move to the problem solving process instead of looking for errors in the first place. Also, using same or interoperable data formats brings value to all members of the design team. They can share models easily and make sure that their design is aligned with the others.

6.2.2 Problem Solving Process

On Figure 20 the updated BPMN schema of Problem Solving Process is illustrated. Compared to the current state (Figure 14) presented in Chapter 5.1 the whole process narrows and becomes more synoptic after IPD is adopted. As can be seen, most of the decisions are made within one lane of the IPD Team. Also, due to the Contract Task Matrix, the step of the task assignment is clear and fast. The Digital Data Protocol defines which are the input and output data, who transmits them and in which format they are uploaded to the cloud. According to the Governing structure (Figure 5), if agreement cannot be made within the IPD Team, the Senior Management Group steps in and makes the final call. Therefore, the decision process is transparent and fair.

The schema also presents how BIM implementation can move the process to a higher level. With the use of a 3D model potential problems can be identified easily and also after changes made to the design any new clashes can be determined immediately with the use of a Model Checker. The end results show smaller variety of data formats which allows integrated approach to problems.

6.2.3 Design Change Order

Change orders are used to document changes in the project regarding the cost, schedule, program or the ICL. Therefore, if Architects issue a change request, the IPD Team evaluates the impact of this change to the project and decides whether it is feasible or not. Putting the evaluation on the first place is crucial and prevents future problems related to delayed date of completion or high costs. Exhibit C of the contract serves as the reference document where the Project Objective is declared and ICL is defined. Constant upgrade of this document is necessary to control the schedule, budget and quality of the project.

The schema on Figure 21 highlights the potential improvements regarding BIM adoption. Detailed 3D model of the building can be scanned in the Model Checker software that detects all the clashes or errors that can bring the need for change requests in the future. Therefore, the number of these misalignments that are discovered late in the process can be reduced to the minimum. More time can be spent on the design enhancement and details. Also, every change made in the model is automatically transferred to the 2D projection of the building and drawings can be generated much faster.

In the end, the improvement of the Design Change Order process leads to faster and smoother flow of the tendering process.

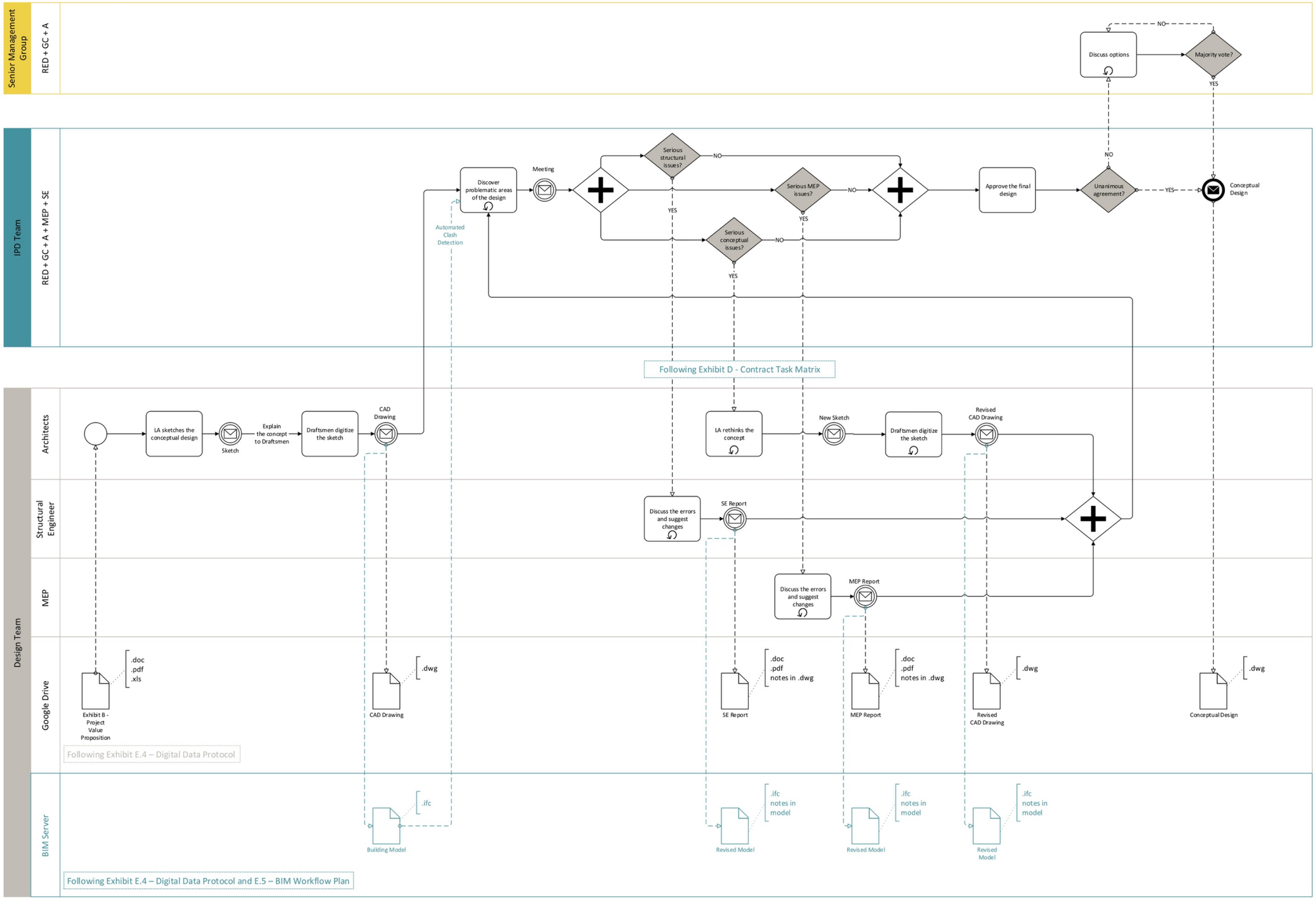

Figure 19: Updated Design Development process

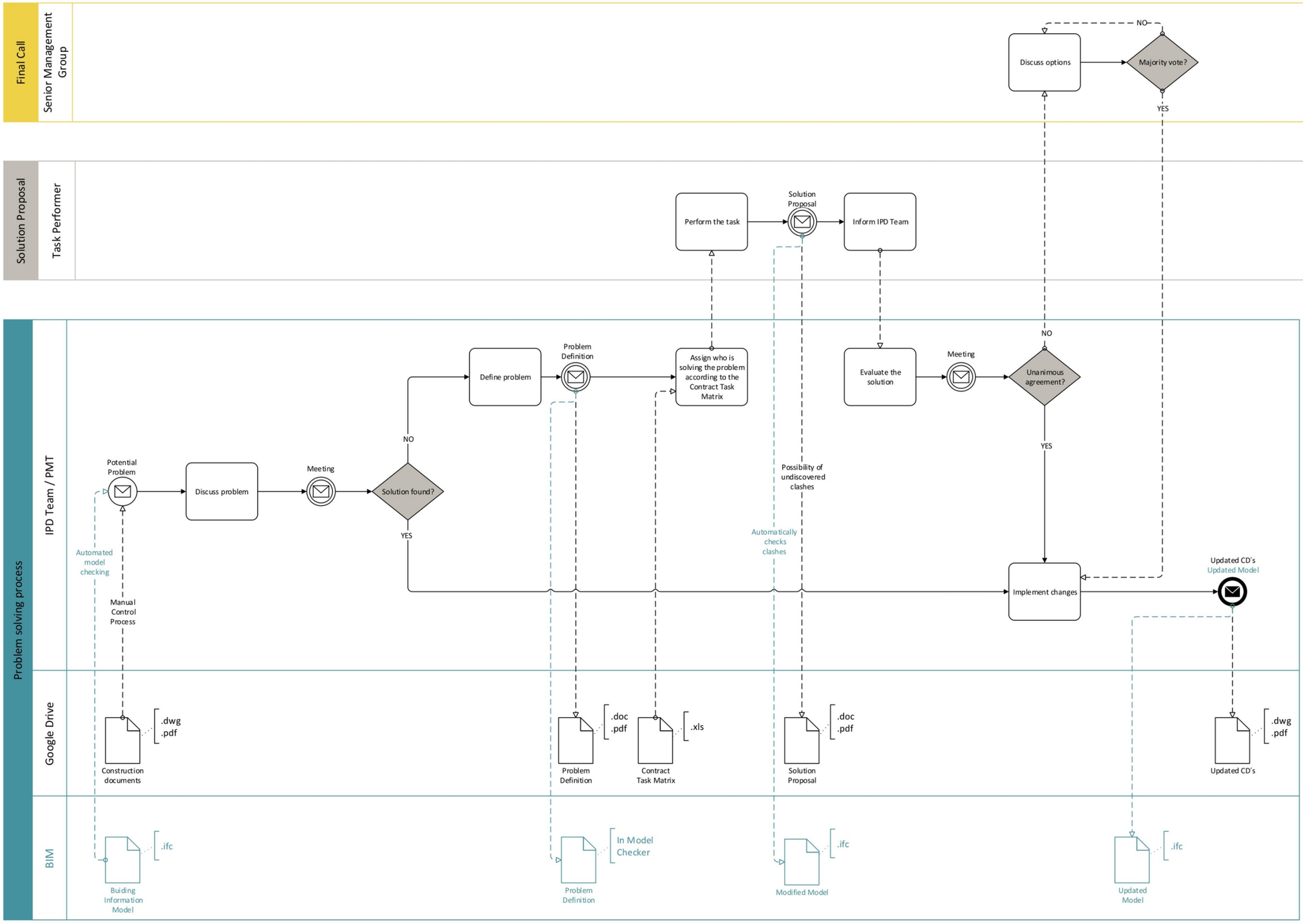

Figure 20: Updated Problem Solving Process

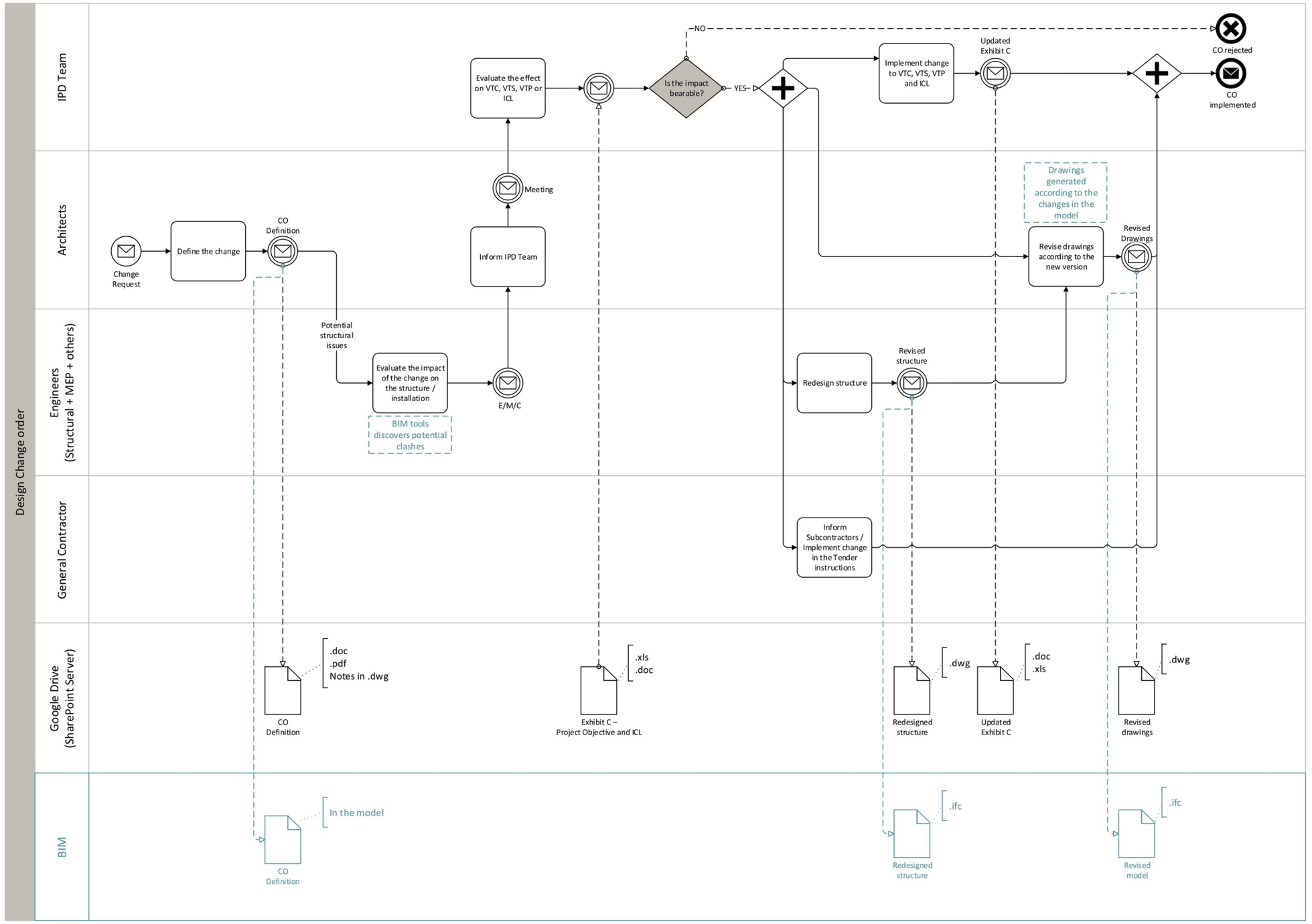

Figure 21: Design Change Order update

Results

7 Conclusions

This section of the paper provides the overall conclusions of the research. Firstly, the research questions stated in the Introduction chapter are answered in Chapter 7.1. Chapter 7.2 reflects on practical consequences of the research and evaluates the impact of changes on the workflow of the Development. In the end, areas for future research are recommended in Chapter 7.3.

7.1 Scientific relevance

Q-A1: What is the current workflow situation of projects developed by RED?

Mutual respect and willingness to work together as an integrated team of professionals is the core idea of the Development. Even though the competences of each party are expected to be balanced it is evident that the Lead Architect remains to be the one who makes the final call. This condition needs to be accepted and understood because LA is the success indicator of current projects with a strong personality. Nevertheless, processes around him can be improved and adapted to these conditions. Therefore, the workflow of these processes occurring within current projects was studied to detect problematic areas.

Currently, both of the studied projects are in the construction phase and the workflow is rather organic and unplanned. Since the construction documents are not complete, most of the problems are being solved when they occur and not beforehand. This evolves in delays and therefore high costs issues.

The intentions are to keep the atmosphere friendly, trust each other and work together as an integrated team. However, the contractual setting is not build on these criteria and therefore, this leads to low ability to make a final decision. Especially when LA is allowed to take his time to finish the design and that often takes longer than planned. Similarly, risks and benefits are not shared adequately among parties presenting one of the crucial problems that leads to hesitancy to take over some of the complicated and uncertain tasks.

Q-A2: What kinds of managerial/contractual improvements are crucial to adopt for efficient collaboration?

IPD is chosen to provide managerial solution to the problematic areas discovered in the Process Analysis. While adopting the IPD principles all parties come together and define common goals and project objectives. This leads to overall understanding of individual roles in the consortium and builds trust among parties. Governing structure is established in order to define the decision making process. Therefore, everyone knows who to refer to when decisions need to be made. The risk and reward sharing zone is agreed on and serves

as a stimulator that leads to higher performance of every key partner involved in the project. The agreement provides a constitution-like document that suggests directions and ethics for the integrated team.

Q-B1: Which SW tools are used in nowadays practice?

Companies involved in the Development use standard tools such as email for information exchange, 2D AutoCAD for design development or Excel spreadsheets for estimating or financial tasks. Basic cloud storage through Google Drive is also set up in order to make the sharing process easier. These tools do not represent the most advanced solution for integrated environment, however, if used effectively they can be sufficient instruments for the Development at this moment.

Q-B2: How can the SW tools usage become more efficient?

In order to make sure all parties have the digital data they need and all the information gets to the right people a proper structure and guidance on data sharing needs to be provided and agreed on by all team members. Communication manual should be proposed to set rules for communication such as description of information that should be included in the document or who transmits and receives the information.

The IPD Agreement offers guidance in form of a Digital Data Protocol on how to assemble simple but still accurate structure and instructions for information sharing in the consortium. Once the protocol is completed it is clear where the data can be found, who is responsible for their elaboration or who is the end user of these data.

7.2 Societal relevance

In pursuance of trust and willingness to collaborate on successful project delivery the field for discussion has to be open but defined in the same time. IPD presents impartial approach to project management and provides support for alliances of professionals from various fields. Entering into the IPD Agreement clearly defines responsibilities of parties, stimulates for better performance through risk and reward sharing and leads to successful and innovative project delivery.

One of the key principles of IPD is the importance of early involvement of key stakeholders. As a result, more effort is invested during the design development phase of the project. Therefore, the LA acquires time and also requires support from other specialists when problems go beyond his own expertise. The true value of IPD lies behind the close cooperation of variety of specialists from the moment project is launched. Potential problems of all characters are much more likely to discover in a diverse team and less costly if discovered during the design phase.

In the end, when IPD principles are applied within the Development structure, roles and responsibilities of parties become distinct. Everyone in the Development knows what is expected from him and what he or she can expect from others. The incentive compensation layer serves as a stimulator for higher performance by putting agreed percentage of profit at risk. Parties are more bound together and the idea of collaborating and sharing grows into the common vision.

7.3 Future Research

If we look at the big picture, the building design practice has not changed much over the centuries. There are new materials, new technologies, new machinery, new tools but in the end the process of designing is still the same. When computers became a standard practice it seemed like things are about to move faster and easier. Nevertheless, moving from the drawing board to CAD changed the drafting method but not the design process (Shen et al., 2009).

It is proved that sketching and hand detail drawing still has its place in nowadays design process and automation is not appropriate in particular in the early stages of the design. Especially, if every construction project is unique as it comes to its location, purpose or budget. As Carr (2014) states in *The Glass Cage*, "When automation distances us from our work, when it gets between us and the world, it erases the artistry from our lives". The balance is very important.

Building Information Modelling presents a new way of designing. It moves the design process into another dimension by creating a complex model of the building, not just plans and sections. BIM becomes attractive to most of the Stakeholders as the technology demonstrates real business benefit (Shen et al., 2009).

Regarding the Development, BIM implementation process presents the next area for research. As for now, the software tools used by parties are the standard tools used on construction projects by the majority of professionals. However, if the Development wants to move their projects to a higher level and make a difference BIM is the way to go. Since the LA tends to design unique buildings and focuses on the details BIM presents a perfect tool for the team around him. BIM helps to identify areas of potential clashes and therefore serves as a very valuable tool for designers and project managers to avoid the number of change orders and costly solutions.

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Appendices

A. IPD Agreement - Template

[PROJECT NAME]

INTEGRATED PROJECT DELIVERY AGREEMENT

[Profit Deferred Until Final Completion]

This IPD Agreement template is based on following publications:

AIA. (2009). *Document C191 ™ - 2009*. Retrieved from http://www.aia.org/groups/aia/documents/pdf/aiab081495.pdf

HansonBridgett LLP. (2010). *Integrated Project Delivery Agreement*. Retrieved from https://www.usgbc-ncc.org/storage/documents/Presentations/SF/2010-1-26_hanson_bridgett_standard_ipd__agreement.pdf

[PROJECT NAME]

INTEGRATED PROJECT DELIVERY AGREEMENT

This Integrated Project Delivery Agreement (**"Agreement"**) is entered into on [DATE] (**"Effective Date"**) by and between:

The Owner (**"Owner"**):
[name]
[entity type]
[address]
[city]

The Architect (**"Architect"):**
[name]
[entity type]
[address]
[city]

The Contractor (**"Contractor"**):
[name]
[entity type]
[address]
[city]

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HansonBridgett LLP. (2010). *Integrated Project Delivery Agreement*. Retrieved from https://www.usgbc-ncc.org/storage/documents/Presentations/SF/2010-1-26_hanson_bridgett_standard_ipd__agreement.pdf

1 DEFINITIONS

1.1 Defined terms will be capitalized throughout the Agreement. Most definitions for this Agreement appear in alphabetical order in **Exhibit A** and may also be bolded the first time the term is used. Other terms that are capitalized are described or defined within the Agreement or General Conditions. The Owner, Architect and Contractor may be individually referred to as the **Party** and will be collectively referred to throughout this Agreement as the **Parties.**

2 THE PROJECT AND RELATIONSHIP OF THE PARTIES

2.1 The Project

The Project consists of [insert general project description].

2.2 Project Objective

During the Conceptualization Phase the Parties will jointly develop the Project Objective based upon the Owner's requirements, goals and limitations. The Project Objective is comprised of the **Validated Target Program** (**VTP**), **Validated Target Cost** (**VTC**), and **Validated Target Schedule** (**VTS**), which establishes the Project requirements and metrics for measuring the Project's success. If, after development and validation under Section 7.2.1, the Parties agree to the Project Objective it will be incorporated into this Agreement as **Exhibit C**.

The Owner, Architect and Contractor will collaboratively work together to achieve the Project Objective by:

2.2.1 Individually performing the Contract Tasks designated as their respective responsibilities in the Contract Task Matrix set forth in **Exhibit D**;

2.2.2 Jointly managing the Project through the Project Management Team ("PMT") pursuant to Section 4;

2.2.3 Cooperating with the PMT and the Project Implementation Team ("PIT") described in Section 5, subject to the limits of their respective professional expertise, licensing and abilities; and

2.2.4 Complying with all other obligations, terms and conditions of this Agreement.

3 THE PARTIES

3.1 Relationship of the Parties

Although this Agreement establishes a relationship of mutual trust and good faith among the Parties, who recognize that their individual success is directly tied to the performance of other Project participants, it does not create an agency relationship, fiduciary relationship, partnership, or joint venture between the Parties. The Owner, Architect and Contractor are each independent contractors solely responsible for directing and managing their own forces and services within their respective area of responsibility as described in Section 4. The Parties acknowledge that this Agreement is not a design/build agreement and that each Party is responsible for its own errors, omissions or construction

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defects to the extent provided in this Agreement. Likewise, nothing contained in this Agreement will make any Party jointly and severally liable for the negligent acts or omissions of any other Party.

3.2 Owner

The Owner is responsible for expressing the requirements, goals and limitations that must be accommodated in the Project and actively participating in developing and documenting the Project Objective. In addition, the Owner will perform and/or provide the following **Work** or services:
Project site.

3.2.1 Retain the following consultants and contractors:

[Insert consultants]
[Insert contractors]

3.2.2 Provide the PMT with available information regarding the Project and the Project Site;

3.2.3 Provide insurance and legal services necessary for the Project;

3.2.4 Perform the Contract Tasks assigned to it in the Contract Tasks Matrix, set forth in **Exhibit D**;

3.2.5 Provide the PMT with timely decisions necessary to support the Project Objective throughout the Project duration;

3.2.6 Make timely payments as required by this Agreement; and

3.2.7 Perform all of its other obligations under this Agreement.

3.3 Architect

The Architect is responsible for designing the Project, except for those portions of the Project that are being designed through design/build subcontractors, in a manner that meets the Project Objective. In addition, the Architect will perform and/or retain the following Work or services:

3.3.1 Retain the following consultants:

[Insert consultants]

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3.3.2 Perform all Contract Tasks assigned to it under the Contract Tasks Matrix set forth in **Exhibit D.**

3.3.3 Manage and coordinate all design submissions, questions and responses to all applicable **Governmental Authorities** and all other reviewing and permitting agencies.

3.3.4 Sign and affix its professional seal on all documents prepared by it and arrange for its consultants to do the same for all documents prepared by each of them, to the extent required by the **Project State**.

3.3.5 Perform all services and furnish all reports, affidavits, certificates, and other documents required by Governmental Authorities pursuant to the building code or other codes, statutes or regulations of the Project State and other applicable laws and regulations relating to those portions of the Project designed by the Architect, and will require its consultants to do the same with respect to portions of the Project designed by them.

3.3.6 Perform all of its other obligations under this Agreement.

3.4 Contractor

The Contractor is responsible for constructing the Project in accordance with the Implementation Documents and for supervising, directing, managing and performing construction work in a manner that meets the Project Objective. In addition, the Contractor will perform and/or retain the following Work or services:

3.4.1 Retain all design/build subcontractors and all other standard subcontractors required for the Project, except for those separate contractors retained directly by the Owner. All design/build subcontractor services will be provided by a Project State licensed professional and all design/build documents will be stamped and signed by the registered engineer and/or architect. In addition, the design/build subcontractors will furnish all reports, affidavits, certificates, and other documents required by and Governmental Authority that are required by the applicable building codes, laws and regulations governing those portions of the Project.

3.4.2 Perform all Contract Tasks assigned to it under the Contract Tasks Matrix set forth in **Exhibit D.**

3.4.3 Assist the Architect during all phases of design by providing cost and constructability information that will support **Target Value Design** and will coordinate design information between design/build subcontractors and the **Project Implementation Team** (**PIT**).

3.4.4 Manage Project information by using a **Building Information Model** or Models linked to Project cost and schedule databases.

3.4.5 During the Construction Phase, the Contractor will manage, perform, oversee and direct all construction work in accordance with the Implementation Documents through Final Completion of the Project.

This IPD Agreement template is based on following publications:

AIA. (2009). *Document C191 [TM] - 2009*. Retrieved from http://www.aia.org/groups/aia/documents/pdf/aiab081495.pdf

HansonBridgett LLP. (2010). *Integrated Project Delivery Agreement*. Retrieved from https://www.usgbc-ncc.org/storage/documents/Presentations/SF/2010-1-26_hanson_bridgett_standard_ipd__agreement.pdf

4 PROJECT MANAGEMENT TEAM

4.1 Project Management Team (PMT)

The PMT includes representatives of the Owner, Architect and Contractor. The PMT provides executive level guidance for collaborative planning, design management and construction of the Project to achieve the Project Objective. The PMT is responsible for reviewing Project progress and for developing benchmarks, metrics, or standards for progress evaluation.

4.2 Authority and Responsibility

The PMT will manage and coordinate implementation of the Project Objective and provide direction to the Parties and to the PIT. Subject to the requirement that its decisions be unanimous, it is authorized to manage and direct the Project. The PMT is not, however, authorized to direct the actions of Architect's or Contractor's employees and is not responsible for any failure of Contractor or Architect to perform their respective obligations.

4.3 Reliable Participation

Fundamental to the success of the PMT is the willingness and ability of each member to participate reliably throughout the Project by providing dependable commitments, promises, and information in the best interest of the Project. The Parties commit to supporting the full engagement of their PMT representative and to providing the necessary resources to allow the PMT member to meet or exceed its commitments.

4.4 Interpretation of Implementation Documents

The PMT has the sole authority to interpret the Implementation Documents and will review and respond to all written requests for information or clarification. A Party may not proceed with any work related to a request for clarification until a written response is received from the PMT pursuant to Section 4.7 The PMT will resolve all questions, discrepancies, ambiguities and other clarifications regarding the requirements of the Implementation Documents in accordance with this Agreement and the Project Objective.

4.5 Project Meetings

The PMT will hold Regular Meetings and Special Meetings as set forth below. The PMT will designate a party to facilitate communications between the Project participants, lead Regular and Special Meetings and prepare minutes of all PMT meetings (**Meeting Facilitator**).

4.5.1 Regular Meetings

The PMT will establish a regular meeting schedule, which in general should be no less frequently than [weekly]. Regular Meetings will be held to review, discuss and evaluate the current status of the Project with respect to design issues, cost, and schedule and implement programs to improve overall Project performance. The Regular Meetings will be held separately from other meetings to assure proper management of the Project and encourage candor among the Parties. The Regular Meetings may

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include Senior Management Representatives from each of the Parties as determined by the PMT members.

4.5.2 Special Meetings

Special Meetings may be requested by any PMT member to allow the PMT to address a matter of urgency. The Party requesting the Special Meeting will provide at least 3 business days written notice, unless all PMT members agree to a shorter timeframe. Notice of a Special Meeting will identify the issues to be addressed. If a PMT member is not able to attend either a Regular Meeting or Special Meeting because of a scheduling conflict, an alternate member of the Party may be designated pursuant to Section 4.8.1.

4.6 Direct Communications

The PMT members, and their employees, are encouraged to communicate directly as necessary to efficiently manage the Project and to execute each individual PMT member's responsibilities. All decisions affecting design, cost or schedule, however, must be made by the PMT jointly in accordance with Section 4.7 and confirmed in writing in a **PMT Directive**.

4.7 Decision Making

Decisions of the PMT will be by unanimous agreement. If the PMT is unable to reach agreement, the PMT will refer the issue to the Senior Management Representative level under Section 4.9, who will first attempt to reach a consensus and only if a consensus is not reached, will decide the issue by majority vote. Notwithstanding the above, the Owner will have the right to make decisions that are opposed by all non-Owner members of the PMT by issuing a written **Owner's Directive**. If an Owner's Directive causes the cost of the Project or the **Contract Time** to be increased, the VTC or VTS will be adjusted accordingly. Any dispute resulting from an Owner's Directive may be pursued under the Dispute Resolution provisions set forth in Section 15 of this Agreement.

4.8 Parties' Representatives

The PMT will include a representative from each Party as identified below. Each Party will assure that its PMT representative attends all PMT meetings, has authority to act on behalf of the Party, and fulfills his or her responsibilities as a PMT representative. The PMT may approve any representative's designation of an alternate representative but any proposed replacement of a PMT representative will be subject to the PMT's approval, which will not be unreasonably withheld.

4.8.1 The Owner's PMT representative

is [name]

4.8.2 The Architect's PMT representative

is [name]

4.8.3 The Contractor's PMT representative

is [name]

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AIA. (2009). *Document C191 ™ - 2009*. Retrieved from http://www.aia.org/groups/aia/documents/pdf/aiab081495.pdf

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4.9 Senior Management Representatives

Each Party will be represented by a Senior Management Representative who will act on its behalf with respect to the Dispute Resolution Procedures set forth in Section 15 and, upon request, to meet with the PMT at any Regular and/or Special Meetings. A Party may appoint a replacement Senior Management Representative by providing written notice to the other Parties.

4.9.1 The Owner's Senior Management Representative

is [name].

4.9.2 The Architect's Senior Management Representative

is [name].

4.9.3 The Contractor's Senior Management Representative

is [name].

4.10 Written Confirmation of Decisions

PMT decisions affecting design, cost, schedule or reallocation of the Work will be recorded in writing by a PMT Directive and will be issued directly to the Contractor or Architect for distribution to the appropriate subcontractors and consultants. PMT Directives must be signed by all PMT members to signify their concurrence with the decision. PMT Directives that increase or decrease the VTC or VTS will be further documented by Change Order executed by the Parties. All other decisions will be recorded through written minutes. PMT decisions and meeting minutes will be circulated to the Parties' members and maintained on a collaborative web portal.

4.11 Personnel Management

The PMT will not supervise or control any person employed by Owner, Architect or Contractor in connection with the Project. The PMT may, however, require any Party to remove any person employed in connection with the Project if it determines that the presence of that person is detrimental to achievement of the Project Objective. The Owner, Architect and Contractor will provide personnel in accordance with the Staffing Plan set forth in **Exhibit E.3**. The Staffing Plan will list all individuals assigned to the Project and the percentage of time each individual will devote to working on the Project. The Parties will not remove or reduce involvement of any personnel set forth in the Staffing Plan, without the PMT's written consent, which will not be unreasonably withheld.

5 PROJECT IMPLEMENTATION TEAM

5.1 Project Implementation Team (PIT)

The Project Implementation Team includes Party representatives as well as the consultants, design/build subcontractors, certain subcontractors, and others that may have a significant impact on the Project outcome. The PIT is responsible for designing and implementing the Project consistent with the Project Objective. The composition of the PIT, and the participation of its members, is determined by the PMT and will vary depending upon the stage of the Project and the utility of involving a particular participant at a specific meeting or during a specific period of the Project. The PIT will be directed by the PMT and will meet regularly to discuss and address issues relating to design and construction of

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the Project. The PMT may further subdivide the PIT into taskforces focused on specific Project elements and issues. Unlike the PMT, the PIT can not issue directives. Although the PMT retains authority for project decisions, it will actively seek and consider the input and counsel of the PIT.

6 AWARD OF SUBCONTRACTS AND CONSULTING AGREEMENTS

6.1 Bid List

During the Conceptualization Phase, each Party will provide the PMT, in writing, with the names of persons or entities proposed to perform any portion of the Work. Within ___ days receipt, the PMT will provide a written response if it has a reasonable objection to any proposed entities submitted by any Party. Failure of the PMT to timely object or recommend other potential subcontractors or consultants will constitute the PMT's acceptance.

6.2 Contract Award

Upon completion of the bidding process for each subcontractor and/or consultant, the Contractor and/or Architect will make a written recommendation to the PMT for contract award. If the PMT members reasonably object to a person or entity proposed by the Party, the PMT member will propose another person or entity for which the PMT has no reasonable objection. A Party will not contract with a proposed person or entity reasonably and timely objected to by the PMT. If the proposed but rejected subcontractor or consultant was qualified to perform that portion of the Work and submitted a bid that conforms to the Project Objective and Implementation Documents, the VTC and the VTS will be adjusted accordingly through a PMT Directive and Change Order. Substitutions of a subcontractor or consultant previously selected and approved by the PMT will not be made without PMT approval.

6.3 Licensing Requirements

All subcontractors and consultants will be properly licensed by the Project State for the portion of the Work they are performing.

6.4 Required Subcontract and Consultant Pass Through Provisions

The Parties will endeavor to pass the following provisions through to subcontractors and consultants as set forth below.

6.4.1 Cost Reimbursable Subcontractors and Consultants

6.4.1.1 Waiver of Liability and Claims

The Contractor and Architect will incorporate clauses substantially similar to Sections 13.1 and 13.2 regarding waiver of liability and claims against the Parties and any other Cost Reimbursable Subcontractors or design consultants working on the Project.

6.4.1.2 Indemnification

Substantially similar indemnity provisions to those set forth in Section 13.4 will be incorporated into all subcontracts and consulting agreements. The Owner, Contractor and Architect will be indemnified parties under all such provisions.

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6.4.1.3 Compensation and ICL

The Cost Reimbursable Subcontractors and design consultants will be subject to substantially similar compensation and ICL provisions set forth in Sections 8 and 9.

6.4.1.4 Change Orders and Permitted Delays

The Cost Reimbursable Subcontractors and design consultants will be tied to similar provisions governing Time under Section 11 and Change Order provisions under Section 12.

6.4.2 All Subcontracts and Consulting Agreements

6.4.2.1 Assignment

All subcontracts and consulting agreements will include assignment of the contract by the PMT member to Owner provided that the assignment is effective only after termination of this Agreement by the Owner for cause pursuant to Section 16.3 and only for those subcontract and consulting agreements that the Owner accepts by written assignment of the subcontractor and/or consulting agreement. If the subcontract is assigned pursuant to this Section, and the Work has been suspended for more than 30 calendar days, the subcontractors' and/or consultants' compensation will be equitably adjusted for increases in cost resulting from the suspension.

6.4.2.2 Insurance

The applicable insurance requirements set forth in Section 13.3 and **Exhibit H** will be included in all subcontracts and consulting agreements. The Parties will be named additional insured under all subcontractor commercial general liability policies and auto insurance policies.

6.4.2.3 Contract Flow-through

By appropriate written agreement, the Contractor and Architect will require each subcontractor and consultant, to the extent of the Work to be performed by the subcontractor or consultant, to be bound to the Contractor and/or Architect by terms of the Project Objective, the Contract Task Matrix, and the Implementation Documents, and to assume toward the Contractor and/or Architect all the obligations and responsibilities that the Contractor and/or Architect assumes toward the Owner through those documents. Each subcontract and consulting agreement will preserve and protect the rights of the Parties under this Agreement with respect to the Work to be performed by the subcontractor and/or consultant so that subcontracting will not prejudice the Parties rights. Where appropriate, the Contractor and Architect will require each subcontractor and consultant to enter into similar agreements with tier-subcontractors and tier-consultants.

6.4.2.4 Indemnification

The Contractor will include indemnification provisions into each Fixed Price subcontract that indemnify the Owner, Architect and Contractor from all claims, damages and liability arising out of or related to the subcontractor's construction work including breach of contract, personal injury and property damage.

6.4.2.5 Dispute Resolution Proceedings

All subcontractors and consultants are subject to the dispute resolution proceedings set forth in Section 15.

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7 RESPONSIBILITIES BY PHASE

7.1 Contract Task Matrix

Throughout all phases, the Parties, the PMT and PIT will perform the specific Contract Tasks designated as their responsibility pursuant to the Task Matrix set forth in **Exhibit D**. The PMT will administer performance of the specific Contract Tasks by continuously:

7.1.1 Developing management protocols and monitoring compliance with the management protocols;

7.1.2 Evaluating progress toward the achievement of the Project Objective;

7.1.3 Providing directions, approvals and decision making needed to achieve the Project Objective; and

7.1.4 Actively promoting an environment of cooperation, collaboration and mutual respect in furthering the best interests of the Project.

7.2 Conceptualization Phase

7.2.1 Contract Task Matrix

The Parties will perform their respective Contract Tasks set forth in **Exhibit D**.

7.2.2 Deliverables

The Project deliverables include:

7.2.2.1 Validation of Project Objective

The PMT will confirm the Validated Target Price (**VTP**), the Validated Target Schedule (**VTS**) and the Validated Target Cost (**VTC**), in writing as the Project Objective and the Parties will incorporate the executed Project Objective document into this Agreement as **Exhibit C**. Once the Project Objective is executed, the VTP, VTC and the VTS are the sole criteria for measuring the Project Objective and cannot be modified, except as provided under Section 12.

7.2.2.1.1 Notice of Impasse

If the Parties are unable to reach an agreement to the Project Objective, a Party may declare an impasse by issuing a written **Notice of Impasse**. Unless the Project Objective is agreed to within 14 calendar days' receipt of a Notice of Impasse, this Agreement will terminate for convenience and the Owner will only be responsible for paying non-Owner PMT member's the **Allowable Costs** incurred prior to the Notice of Impasse, including demobilization costs, if any, or costs of subcontractor or consultant contract obligations that could not be avoided by the Contractor or Architect. Termination costs do not include any overhead, profit, lost opportunity, or any other costs caused by or related to the termination. All designs, models, drawings, calculations or reports prepared by the PMT or its members prior to termination will be delivered to the Owner for its use, at its discretion, for the continuation of the Project. If the Owner uses these materials, it will indemnify, defend and hold harmless Contractor and Architect from any liability arising from the use of these materials.

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7.2.2.2 Incentive Compensation Layer

The PMT will set the Incentive Compensation Layer and the ICL Distribution Percentage pursuant to Section 9.

7.2.2.3 Management Protocols

If the Project Objective is confirmed, the Parties will develop Management Protocols consisting of: (i) PMT Work Plan set forth in **Exhibit E.1**; (ii) Cost Management Strategy set forth in **Exhibit E.2**; and (iii) BIM Workflow Plan set forth in **Exhibit E.4.**

7.2.2.4 Joint Site Investigation

The PMT will conduct Joint Site Investigations in accordance with Section 3.2 of the General Conditions to this Agreement.

7.2.2.5 Project Manual

The PMT will develop a Project Manual in accordance with Section 2.2 of the General Conditions to this Agreement.

7.3 Criteria Design Phase

7.3.1 Contract Task Matrix

The Parties will perform their respective Contract Tasks set forth in **Exhibit D**.

7.3.2 Deliverables

Criteria Design deliverables consist of:

7.3.2.1 Building Information Model

Development of the BIM in accordance with Section 4 of the General Conditions.

7.3.2.2 Conceptual Drawings and Specifications

Development of conceptual drawings, outline specifications, reports and other documentation required by the PMT.

7.3.2.3 Procurement Schedule

Development of a Project Procurement Schedule that complies with the requirements of the VTS and sets forth the timeframe to purchase subcontracts and release fabrication or purchase long lead items.

7.3.2.4 Independent Assessor

Appointment of an Independent Assessor who will make the Quality Adjustment decisions under Section 9.5 if the Parties cannot reach agreement regarding the Quality Adjustment of the ICL or the proportion of ICL payable if Owner terminates for convenience under Section 16.1.2.

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7.3.3 The Criteria Design deliverables

will illustrate development of the VTP and describe in sufficient detail the final criteria for design and implementation of the Project in a manner consistent with the Project Objective. The PMT will determine the method for delivery of the Criteria Design Deliverables.

7.3.4 Monitoring

The PMT will coordinate and track compliance with the Project Objective through adherence to the Management Protocols set forth in **Exhibits E.**
PMT and PIT members will provide prompt written notice to the PMT of any deviations or other variations from the Management Protocols. PMT and PIT members will deliver periodic written reports (including cost reports), in a form and as frequently as required by the PMT, indicating compliance with, or deviations from, the Management Protocols. The Management Protocols will be revised by the PMT prior to commencement of the next phase as necessary to achieve the Project Objective.

7.4 Detailed Design Phase

7.4.1 Contract Task Matrix

The Parties will perform their respective Contract Tasks set forth in **Exhibit D**.

7.4.2 Deliverables

The Detailed Design deliverables consist of:

7.4.2.1 Building Information Model

Further development of the Model in accordance with Section 4 of the General Conditions to this Agreement.

7.4.2.2 Project Drawings and Detailed Specifications

Further development of the Project drawings and specifications to provide detailed layouts for architectural, structural and mechanical, electrical and plumbing system design including all sections, elevations, and typical construction details. The Project drawings and specifications will demonstrate the development of the approved Criteria Design deliverables and will fix the size, form and character of the building assemblies, systems and other components; specify materials and systems and establish their performance requirements and quality levels; and provide other information necessary and appropriate to implement the Project in a manner consistent with the Project Objective. The PMT will determine the method for delivery of the Detailed Design deliverables.

7.4.2.3 Project Reports

Procurement or creation of other relevant Project reports and documents as determined by the PMT.

7.4.2.4 Procurement Schedule

Further refinement of the Procurement Schedule developed in the Criteria Design Phase.

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7.4.3 Monitoring

The PMT will coordinate and track compliance with the Project Objective through adherence to the Management Protocols set forth in **Exhibits E**. PMT and PIT members will provide prompt written notice to the PMT of any deviations or other variations from the Management Protocols. PMT and PIT members will deliver periodic written reports (including cost reports), in a form and as frequently as required by the PMT, indicating compliance with, or deviations from, the Management Protocols. The Management Protocols are revised by the PMT prior to commencement of the next phase as necessary to achieve the Project Objective.

7.5 Implementation Documents Phase

7.5.1 Contract Task Matrix

The Parties will perform their respective Contract Tasks set forth in **Exhibit D**.

7.5.2 Deliverables

The deliverables consist of the following:

7.5.2.1 Construction Model

The BIM will be augmented and coordinated to include all shop drawing, product data and other submittal information required for fabrication and installation of the Work together with detailed drawings, specifications and other documents required to complete Agency Review, Project Purchasing and construction of the Work.

7.5.2.2 Implementation Documents

The Implementation Documents will illustrate the development of the approved Detailed Design deliverables and will include the final plans, sections, elevations, typical construction details together with dimensions and layouts for architectural and structural design and mechanical, electrical, and plumbing systems. The Implementation Documents will describe in detail the requirements for construction of the Work and provide information necessary and appropriate to implement the Project in a manner consistent with the Project Objective. The PMT will determine the method for delivery of the Implementation Documents.

7.5.2.3 Prefabrication

The PMT may authorize prefabrication of systems that are fully described as well as early procurement of materials and equipment.

7.5.3 Monitoring

The PMT will coordinate and track compliance with the Project Objective through adherence to the Management Protocols set forth in **Exhibits E**. PMT and PIT members will provide prompt written notice to the PMT of any deviations or other variations from the Management Protocols. PMT and PIT members will deliver periodic written reports (including cost reports), in a form and as frequently as required by the PMT, indicating compliance with, or deviations from, the Management Protocols. The Management Protocols are revised by the PMT prior to commencement of the Construction Phase as necessary to achieve the Project Objective.

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7.6 Agency Review

7.6.1 Contract Task Matrix

The Parties will perform their respective Contract Tasks set forth in **Exhibit D**.

7.6.2 Deliverables

Agency Review deliverables consist of all approvals, consents and permits required by the governing agencies who have jurisdiction over the Project for design and construction of the Work.

7.6.3 Commencement and Completion

Agency Review commences with the Criteria Design Phase and is completed on or before the date of commencement of the Work set forth in the Owner's **Notice to Proceed.**

7.7 Project Purchasing

7.7.1 Contract Task Matrix

The Parties will perform their respective Contract Tasks set forth in **Exhibit D**.

7.7.2 Deliverables

The purchasing deliverables consist of:

7.7.2.1 Procurement of Subcontracts and Purchase Orders

The Contractor will procure all labor, materials and equipment necessary to complete construction in accordance with the Implementation Documents and the Project Objective. The PMT will direct and oversee the Contractor's selection and procurement of subcontractors and suppliers and authorize the Contractor to enter into the necessary written subcontract agreements and purchase orders. The PMT will have appropriate commitments for labor, materials, equipment and construction-related services in place prior to commencement of the Work to permit the timely and orderly sequencing of the Work.

7.7.2.2 PIT Subcontractors

To enable early involvement of PIT- subcontractors, the Contractor may, subject to approval by the PMT, award PIT subcontracts at any time after commencement of Criteria Design Phase.

7.7.2.3 Procurement Schedule

The procurement of all labor, materials and equipment will comply with the Procurement Schedule.

7.7.3 Commencement and Completion

The Project Purchasing process commences with the Criteria Design Phase and is completed on or before the commencement date set forth in the Notice to Proceed issued by the Owner.

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7.7.4 Monitoring

The PMT will coordinate and track compliance with the Project Objective through adherence to the Management Protocols set forth in **Exhibits E**. PMT and PIT members will provide prompt written notice to the PMT of any deviations or other variations from the Management Protocols. PMT and PIT members will deliver periodic written reports (including cost reports), in a form and as frequently as required by the PMT, indicating compliance with, or deviations from, the Management Protocols. The Management Protocols are revised by the PMT prior to commencement of the Construction Phase as necessary to achieve the Project Objective.

7.8 Construction and Construction Administration

7.8.1 Contract Task Matrix

The Parties will perform their respective Contract Tasks set forth in **Exhibit D**.

7.8.2 Deliverable

Final Completion of the Work.

7.8.3 General Conditions

The terms and conditions governing administration and construction of the Work are stated in the General Conditions to this Agreement.

7.8.4 Monitoring

The PMT will coordinate and track compliance with the Project Objective through adherence to the Management Protocols set forth in **Exhibits E**. PMT and PIT members will provide prompt written notice to the PMT of any deviations or other variations from the Management Protocols. PMT and PIT members will deliver periodic written reports (including cost reports), in a form and as frequently as required by the PMT, indicating compliance with, or deviations from, the Management Protocols.

7.8.5 Commencement and Completion

Construction Phase commences on the date for commencement of the Work set in the Notice to Proceed issued by the Owner and must be completed on or before the **Substantial Completion Date** established in the VTS.

7.9 Commissioning and Closeout

7.9.1 Contract Task Matrix

The Parties will perform their respective Contract Tasks set forth in **Exhibit D**.

7.9.2 Deliverables

Closeout Phase deliverables include:

7.9.2.1 Close-Out Documents

Operation and Maintenance manuals, as-built drawings, the **Record Model**, warranties, keying schedules, attic stock, and any other items required under the Implementation Documents.

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7.9.2.1.1 Approval

Within 7 calendar days receipt of the Close Out Documents, the Owner will provide the Architect and Contractor with written notice of its approval and/or identify the items requiring correction. The Contractor and/or Architect will correct any non-conforming items within 7 business days receipt of notice.

7.9.2.2 Lien Releases

The Architect and Contractor will provide the Owner with the unconditional lien releases and waivers required under Section 10.5.

7.9.2.3 ICL Determination and Adjustment

The PMT will complete a final accounting of project costs and determine whether and to the extent the Project Objective was achieved. The Incentive Compensation Layer available for distribution will then be determined and adjusted in accordance with Section 8.

8 COMPENSATION

8.1 General

The Architect's and Contractor's compensation for the Project includes Allowable Costs specifically set forth in **Exhibits G.1** and **G.2**, and subject to the quantitative and qualitative success of the Project and achievement of the Project Objective, their respective percentage of the adjusted and available **Incentive Compensation Layer** (**ICL**).

9 INCENTIVE COMPENSATION LAYER

9.1 Incentive Compensation Layer

At the conclusion of the Conceptualization Phase, and at the same time the Project Objective is validated, the Parties will set the Incentive Compensation Layer and the ICL Distribution Percentages, recording them in **Exhibit C**. The ICL is an amount agreed by the Parties, but is normally based on the amount of Architect's and Contractor's usual profit (all or a portion) that is not included in their respective Allowable Costs. The ICL is at risk if the VTC is exceeded, the VTS is exceeded, and/or the Quality Adjustment is negative, but may also be increased, depending upon Project success, as described below.

9.2 ICL Adjustments

Within 14 calendar days after Final Completion, the PMT will meet and adjust the ICL by first applying the Project Cost Adjustment per Section 9.3 and then the Schedule Adjustment under Section 9.4. If there is ICL remaining after these two adjustments, the PMT will meet within an additional 7 calendar days to consider and determine the Quality Adjustment per Section 9.5.

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9.3 Project Cost Adjustment

9.3.1 Project Cost Under VTC

If at Final Completion, the total Allowable Costs incurred by Contractor and Architect are less than the VTC, the ICL is increased by 50% of the difference between the total Allowable Costs incurred and the VTC.

9.3.2 Project Cost Exceeds VTC

If at Final Completion, the total Allowable Costs incurred by the Contractor and Architect are more than the VTC, the ICL will continue to be reduced to cover the Project Allowable Costs until the ICL is exhausted. Once the ICL is exhausted the Owner will continue to compensate the Architect and Contractor for Allowable Costs until Final Completion.

9.4 Schedule Adjustment

9.4.1 VTS Accelerated

If Substantial [Final] Completion is achieved before the milestone Substantial [Final] Completion Date established in the VTS, the ICL will be increased by $_____ for each day that the Substantial [Final] Completion date established in the VTS is accelerated.

9.4.2 VTS Exceeded

If Substantial [Final] Completion is achieved after the milestone Substantial Completion Date established in the VTS, the ICL will be decreased by $_____ for each day that the Substantial [Final] Completion date established in the VTS is delayed.

9.5 Project Quality Adjustment

9.5.1 Quality Rating

Any ICL remaining after applying the Project Cost and Schedule Adjustments will be distributed to the Architect and Contractor based on an assessment of the Quality Criteria listed in the table below. If the sum of the Quality Rating is positive, the ICL will be increased by __% per Quality Rating point and if negative, the ICL will be decreased by ___% per Quality Rating point. The rating for an individual Quality Criterion may be any integer between -5 to +5 with -5 being substantially worse than required by the Project Objective, 0 being adequate to meet the Project Objective and + 5 being substantially better than required by the Project Objective.

Standard	Quality Criteria	Potential Quality Points
Quality	*Materials*: Are the materials installed of the quality, durability and maintainability required by the VTP?	[-5 to +5]
	Workmanship: Is the workmanship of the completed Work consistent with the VTP?	[-5 to +5]
	Performance: Are the building systems operational and functioning in accordance	[-5 to +5]

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	with the performance requirements stated in the VTP?	
Functionality	*Spatial*: Does the Project provide the spaces required by the VTP?	[-5 to +5]
	Functional: Does the arrangement of spaces comply with the VTP so that it meets the needs of the Owner's staff and assist them in carrying out their responsibilities?	[-5 to +5]
	Usability: Does the arrangement of spaces comply with the VTP so that it meets the needs of the Owner's clients and others that will use the space?	[-5 to +5]
Aesthetics	*Visual Appeal*: Does the completed Work provide the visual appeal required by the VTP?	[-5 to +5]
	Cultural Expression: Does the completed Work express the Owner's culture and uniqueness as stated in the VTP?	[-5 to +5]
Sustainability	*Sustainable Design Objective Achieved*: Has the Sustainable Design Objective stated in the VTP been achieved?	[-5 to +5]
	Sustainable Design Innovation: Does the completed Work provide sustainable design solutions that are innovative?	[-5 to +5]
QUALITY RATING:		[-50 to +50]

9.5.2 PMT Assessment

The PMT will meet no later than 14 calendar days after finalizing the Project Cost and Schedule Adjustments to attempt to agree upon a Quality Adjustment. If the PMT does not reach consensus within 7 calendar days after the first Quality Adjustment meeting, any Party may demand in writing that the adjustment be made by Independent Assessment under Section 9.5.3.

9.5.3 Independent Assessment

During the Criteria Design Phase, the Parties will appoint an Independent Assessor to make the Quality Adjustment, if required. If the Parties failed to appoint an Independent Assessor or the Independent Assessor is no longer willing or able to make the assessment, and the Parties cannot agree upon a replacement Independent Assessor, then the Quality Assessment will be made by an arbitrator appointed using the procedures in section 15.7.

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9.5.3.1 Within 30 calendar days after demand for Independent Assessment, the Parties will meet with the Independent Assessor or arbitrator to present any information a Party believes will aid the Independent Assessor. The Party presentation will not exceed one hour per Party. The Independent Assessor or arbitrator will be provided with a copy of this Agreement, will be given an opportunity to inspect the project, and may request any other information the Independent Assessor or arbitrator believes necessary to make the assessment.

9.5.3.2 Within 7 calendar days after the assessment hearing, the Independent Assessor or arbitrator will issue a written decision stating the number of Quality Rating Points awarded (positive or negative) and a brief statement setting forth the rationale for the award. The Independent Assessor's or arbitrator's award is final and not subject to review or modification.

10 PAYMENT

10.1 Allowable Costs

The Architect's Allowable Costs are set forth on **Exhibit G.1**. The Contractor's Allowable Costs are set forth on **Exhibit G.2. Cost Reimbursable Subcontractors** Allowable Costs will use the same categories as those for the Architect and Contractor, respectively.

10.2 Periodic Payments

Payment Applications will be prepared by the Architect and Contractor in the format agreed by the PMT and submitted for approval no later than the 25th day of the month. The period covered by each Payment Application will be one calendar month. The Payment Application will include all Allowable Costs earned or projected by the Architect and Contractor for that calendar month. The PMT will approve all or part of the Payment Application within 5 business days of receipt. The Owner will make payment for all approved amounts within 30 calendar days.

10.3 Final Payment

The Owner will make Final Payment 30 calendar days after Final Completion of the Work, receipt of all close-out phase deliverables and determination of the ICL adjustment per Section 9. The PMT must approve the Final Payment Application. Final Payment does not waive Owner's right to later object to defective design, materials or workmanship; waive any warranty rights the Owner may have; or release any Party from its indemnification obligations set forth in Section 13.4.

10.4 Materials and Equipment

Periodic Payment Applications may include materials and equipment delivered and suitably stored on-site for subsequent incorporation into the Work or, with PMT's prior approval, suitably stored off-site at a bonded or insured warehouse that is approved by the PMT. The risk of loss will remain on Contractor for all materials and equipment stored off-site. Payment for materials and equipment stored on or off site will be conditioned upon compliance with procedures that protect the Owner's interest and establish Owner's title to the materials and equipment. Stored material costs will include

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the costs of applicable insurance, storage, and transportation to the site, if stored off-site. Contractor will not make advance payments to subcontractors or suppliers for stored materials or equipment without PMT approval.

10.5 Supporting Documents

Each Payment Application will be accompanied by the following:

10.5.1 Sufficient documentation supporting the Allowable Costs claimed in the Payment Application including, without limitation, receipts, purchase orders, contracts, time reports and other documentation reasonably required by the PMT or the Owner.

10.5.2 A duly executed conditional waiver and release forms complying with applicable law covering all services and work performed during the billing period by the Architect, Contractor, subcontractors, consultants, suppliers or any other party entitled to record or serve a stop notice or mechanics' lien.

10.5.3 Certification that Architect and Contractor have no knowledge of any recorded stop notices or mechanics' liens with respect to the Work performed by others and that all subcontractors, consultants and vendors have been paid to date or will be paid with the proceeds for Work covered under the Payment Application.

10.5.4 In addition to the above, within 5 calendar days after receipt of Final Payment, the Architect and Contractor will provide Owner a duly executed unconditional waiver and release form complying with applicable law covering all services and work performed by subcontractors, sub consultants or other suppliers or any other party entitled to record or serve a stop notice or mechanics' lien with respect to any services, work, equipment or material rendered or provided for the Project.

10.6 Right to Withhold

Owner may refuse to approve a Payment Application or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or any part of a prior Payment Application to the extent the PMT determines, or the Senior Representatives determine by majority vote, is necessary to protect Owner from loss arising out of or resulting from:

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10.6.1 Nonconforming Work not remedied.

10.6.2 Third-party claims filed against Owner or the Project or reasonable evidence indicating probable filing of the claims, unless security acceptable to Owner is provided.

10.6.3 Failure of Contractor to make timely payments to subcontractors or for labor, materials or equipment.

10.6.4 Failure of Architect to make timely payments to its consultants for design services rendered in connection with the Project.

10.6.5 Damage to Owner or Owner's separate contractors if the Contractor, Architect, or any entity working directly for Contractor or Architect is potentially liable.

10.6.6 Failure to carry out the Work in accordance with the Implementation Documents performed or other incorrect statements in the Payment Application.

10.6.7 Insufficient documentation, erroneous estimates of value of the Work.

10.7 No Right to Stop Work

If a Party disputes any determination with respect to any Payment Application, the Party will nevertheless expeditiously continue to prosecute the Work, provided amounts not in dispute are timely paid. Owner will not be deemed to be in default or breach of this Agreement for withholding of any payment under Section 10.6.

10.8 Reliance

In taking action on Payment Applications, the PMT may rely on the accuracy and completeness of the information furnished by the Architect and Contractor and will not be deemed to represent that the PMT has made: (i) a detailed examination, audit or arithmetic verification of the documentation or supporting data; (ii) exhaustive or continuous on- site inspections; or (iii) examinations to ascertain how or for what purposes the Architect and Contractor have used amounts previously paid.

10.9 Warranty of Title

Contractor warrants that title to all construction work, materials and equipment covered by a Payment Application, whether incorporated in the Project or not, will pass to Owner at the time of payment by Owner, free and clear of all liens, claims, security interests or encumbrances in favor of Contractor, subcontractors, suppliers, or other persons or entities entitled to make a claim by reason of having provided labor, materials or equipment relating to the work. Contractor will defend, indemnify and hold Owner harmless from any and all liens, claims, security interests or encumbrances filed by Contractor, subcontractors, suppliers, or other persons or entities entitled to make a claim by reason of having provided labor, materials and equipment relating to the work, provided Contractor has received payment pursuant to this Agreement.

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10.10 No Waiver

Payment by Owner will not constitute approval or acceptance of any item of cost in the Payment Application or final acceptance of approval of that portion of the Work to which the partial payment relates.

10.11 Payments to Subcontractors

Neither Owner, nor Architect will have an obligation to pay nor to see to the payment of money to a subcontractor or supplier except as may otherwise be required by law.

10.12 Payment to Consultants

Neither Owner, nor Contractor will have an obligation to pay nor to see to the payment of money to a consultant except as may otherwise be required by law.

10.13 Audit Right

The Owner, at its expense, may audit Architect's or Contractor's financial information related to (i) direct costs, profit and overhead calculations provided in establishing the VTC; (ii) any application for payment or calculation of amounts owed by Owner; and/or (iii) subcontractor or consultant costs submitted as Allowable Costs. The PMT member being audited will reasonably cooperate and make its financial information available for inspection and audit.

10.14 Disputes

Claims for payment including, without limitation, those regarding amounts withheld pursuant to Section 10.6 will be resolved under Section 14.

11 CONTRACT TIME

11.1 Contract Time

The Contract Time is the time allotted in the VTS to achieve Substantial Completion [Final Completion] of the Work. The Substantial Completion and Final Completion dates may only be extended by mutual agreement of the PMT through the Change Order process for Permitted Delays.

11.2 Validated Target Schedule

The VTS will be based on critical path or network precedence methodologies coordinating all major components of the design and construction work including governmental agency deadlines, procurement, submittal and long lead item schedules, construction work by trade, and Owner's occupancy requirements projecting a milestone Substantial Completion Date and Final Completion Date.

11.2.1 Monthly Project Schedules

The Contractor will provide Project schedule updates to the PMT indicating the status of construction and the projected milestone dates for Substantial Completion and Final Completion. If the Project

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schedule update indicates that the milestone dates established in the VTS may be exceeded, the Contractor will submit a recovery plan to the PMT pursuant to Section 11.3.

11.2.2 Interim Project Schedules

The Contractor, with the assistance of the its subcontractors and suppliers, will also use Interim Project Schedules, that provide a 3 week look ahead for the performance of upcoming design and construction requirements and document all construction work performed during the prior 3-week period. The Interim Project Schedule is to be used as a working tool to evaluate any schedule slippages and collaborate on methods for labor efficiency. Work flow will be scheduled based on providing information, material and resources as required by the user of the information, material or resources, optimizing the flow of Work through the Project and reducing bottlenecks and activity that will not advance the Project schedule.

11.3 Schedule Slippage

The Contractor and/or Architect will notify the PMT within 48 hours of any slippage in the VTS as a result of its Work and must submit a detailed recovery plan for evaluation and approval by the PMT.

11.4 Acceleration

The PMT may determine that it is in the best interest of the Project to direct certain subcontractors to work overtime in an attempt to recapture any delays to the VTS.

11.5 Permitted Delays

If the Architect or Contractor are delayed, obstructed, hindered or interfered with in the commencement, prosecution or completion of their Work by: (i) delays in issuance of governmental permits; (ii) **Adverse Weather**; (iii) a **Force Majeure Event**; (iv) **Unforeseen and Differing Site Conditions**; (v) a PMT Directive; or (vi) an **Owner's Directive** and the critical path of the VTS is impacted extending the Substantial Completion [Final Completion] date, then the Architect and Contractor will be entitled to an extension of the Contract Time for the same period of time that the Substantial Completion [Final Completion] date was delayed provided that the delay, obstruction, interference or hindrance was not caused, in whole or in part by any fault, neglect, act or omission of the Architect, Contractor, or their respective employees, subcontractors, suppliers, or consultants. Notwithstanding the above, the Architect and Contractor will not be entitled to an extension of time unless the they notify the PMT in writing of the cause or causes of the delay, obstruction, hindrance or interference within 3 business days of the commencement of the delay and demonstrate that the delay could not have been anticipated or avoided and was not concurrently caused by a condition, event or occurrence that is not a Permitted Delay.

11.6 Unforeseen and Differing Site Conditions

Any Party who claims that a Differing Site Condition exists must notify the PMT in writing within 3 business days of first discovering the conditions and before the condition is disturbed. The PMT will promptly investigate whether a Differing Site Condition exists and the effect, if any, on VTS and/or VTC and render its decision pursuant to Section 4.7. Claims by any Party in opposition of the findings must be made within 21 calendar days after the PMT has given notice of its findings. If the Parties cannot

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agree whether the conditions are materially different or cannot agree on an adjustment in the VTC and/or VTS, the matter will be subject to the Dispute Resolution Process under Section 15.

12 CHANGE ORDERS

12.1 Change Orders

Change Orders will be used to document changes to the VTP, VTC, VTS, or ICL. Change Orders are limited to the following conditions:

12.1.1 PMT Directives

Additional Work that is not reasonably necessary to meet the intent of the Project Objective or elimination of Work that was reasonably necessary to meet the intent of the Project Objective, which affects the VTP, VTC or VTS and is agreed to by the PMT.

12.1.2 Permitted Delays

Permitted Delays pursuant to Section 11.5; and

12.1.3 Owner's Directives

An Owner's Directive to the extent that it results in changes to the Work that increase the VTC or impact the critical path of the VTS and is disputed by the Architect or Contractor after Senior Representative decision under Section 4.7;

12.2 Change Order Procedure

Any Party may request a Change Order to this Agreement by providing the PMT with a written Change Order request (**Change Order Request**) setting forth the nature of the change, the reason for the change, and the effect, if any, on the VTC, VTS, VTP, or ICL. All Change Order Requests must be submitted to the PMT within ___ calendar days of the discovery of the occurrence of the event or circumstance necessitating the change. Failure to submit the Change Order within this deadline waives and releases any claim for a Change Order related to the facts or circumstances that allegedly support the Change Order Request. The PMT will promptly review the Change Order Request and (i) accept the request, (ii) accept the request in part or with modification, (iii) request additional information or perform its own investigation, or (iv) deny the Change Order Request. If a Change Order Request is accepted by the PMT, then a Change Order will be executed by the PMT members formally modifying this Agreement. If the PMT does not act on a Change Order Request within ___ days of its submission, it will be deemed denied. Any disagreements with regard to a Change Order Request will be determined in accordance with the PMT procedures set forth in Section 4.7.

13 LIABILITY ALLOCATION

13.1 Waiver of Liability

The Parties waive and release all claims and liability between and among each other except for the **Excluded Claims** set forth in Section 13.2. However, this liability waiver is void as to any Party that is in **Willful Default** of this Agreement.

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13.2 Excluded Claims

Excluded claims include the following:

13.2.1 Warranty Claims

Contractor and its subcontractors and suppliers will remain liable for all warranty obligations under Section 14.

13.2.2 Project Performance

Claims for (i) personal injury or property damage caused by the failure of the construction work to be executed in conformance with the Implementation Documents; (ii) personal injury or property damages caused by negligent errors or omissions in the design of the Project or its component systems; and (iii) claims for the repair, modification, or replacement of components or systems that do not meet the functional and performance requirements of the Implementation Documents and the Project Objective.

13.2.3 Non Payment

Failure of Owner to pay undisputed amounts due under this Agreement.

13.2.4 Indemnity

Claims to enforce indemnification obligations set forth in Section 13.4.

13.2.5 Insurance

Claims for failure to procure the insurance required under Section 13.3.

13.2.6 Dispute Resolution

Claims to enforce the Dispute Resolution Provisions set forth in Section 15 and civil actions necessary to enforce mechanics' liens and/or stop notice rights.

13.3 Insurance

Owner, Architect and Contractor will purchase and maintain insurance of the type and in the amounts set forth in **Exhibit H**. The Parties agree that their respective insurance companies will have, to the extent available and to the extent coverage is not impaired, no right of subrogation against any other Party on account of any losses arising under insurance maintained or required to be maintained pursuant to this Agreement. Contractor will name the Owner and Architect as additional insureds under its Commercial General liability policy. The Owner, Contractor and its subcontractors will be insureds under the Builder's Risk insurance policy.

13.4 Indemnification

13.4.1 Contractor's Indemnification

The Contractor will defend, indemnify and hold the Owner and Architect harmless from and against any and all claims, losses, damages, liabilities and expenses (including legal, expert witness and consulting fees and costs) by any third parties (including indemnifying Party's employees), arising out of, or resulting from, bodily injury (including death) or damage to tangible property (other than the

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Work itself), but only to the extent caused by the negligent acts or omissions of the indemnifying Party or anyone directly or indirectly employed by it or anyone for whose acts it may be liable.

13.4.2 Owner's Indemnification

The Owner will defend, indemnify and hold the Architect and Contractor harmless from and against any and all claims, losses, damages, liabilities and expenses (including legal, expert witness and consulting fees and costs) alleged by their respective employees arising out of, or resulting from, bodily injury (including death) but only to the extent caused by the negligent acts or omissions of the indemnifying Party or anyone directly or indirectly employed by it or anyone for whose acts it may be liable.

13.4.3 Architect's Indemnification

The Architect will defend, indemnify and hold the Owner and Contractor harmless from and against any and all claims, losses, damages, liabilities and expenses (including legal, expert witness and consulting fees and costs) alleged by their respective employees arising out of, or resulting from, bodily injury (including death) but only to the extent caused by the negligent acts or omissions of the indemnifying Party or anyone directly or indirectly employed by it or anyone for whose acts it may be liable.

13.4.4 Patent and Copyright

Contractor and Architect represent and warrant that designs used by each for the Project do not and will not violate any patents, copyrights or trademarks. Contractor and Architect each indemnify Owner from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, attributable to patent, copyright or trademark violations from the use of infringing patents, copyrights or trademarks in violation of applicable law.

13.4.5 Lien Free Obligation

If any subcontractor, supplier or consultant record or file, or maintain any action on or respecting a claim of mechanics' lien, stop notice or lis pendens, relating to the Work, the Contractor and/or Architect will immediately procure, furnish and record appropriate statutory release bonds, which will extinguish or expunge the mechanics lien, stop notice or lis pendens, provided that the Owner has paid the Contractor and/or Architect for the Work and Contractor and/or Architect failed to pay its respective consultants, subcontractors or suppliers. If Architect or Contractor fail to make payments to its respective consultants, subcontractors and suppliers as required by the payment provisions of this Agreement, the Owner may settle or bond over those claims or take such other actions necessary to prevent a default under any other agreement affecting the Project, and Contractor and Architect will upon written demand reimburse Owner for any substantiated amounts that were necessary to satisfy Architect's and/or Contractor's obligation to satisfy, discharge or defend against any such claim of lien or stop notice. The Architect and/or Contractor will indemnify and hold the Owner harmless from any claims filed by their respective consultants, subcontractors or suppliers for foreclosure on mechanics liens or stop notices provided the Owner has made payment to the Architect and Contractor for such services and/or work. Nothing contained in this Section will be construed to require the Contractor or Architect to provide release bonds for any valid mechanics lien, stop notice, lis pendens or other claim due to non-payment by Owner or a valid dispute between the Parties.

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13.5 Site Safety

The Contractor is solely responsible for training, initiating, maintaining and supervising safety precautions and programs in connection with performance of the construction work. The Contractor will defend, indemnify and hold the Owner and Architect harmless from and against all demands, causes of action and other claims for damage, loss and expense, including but not limited to attorneys' fees, resulting from bodily injury, sickness, disease, death, injury and/or tangible property damage (other than to the Work itself) caused, in whole or in part, from actual or alleged failure to train, initiate, maintain or supervise safety precautions and programs in connection with construction of the Project.

13.6 Joint Defense Approach to Third Party Claims

Because the Parties have a similar interest in the outcome of the Project, the Parties will endeavor to resolve any third party claims (including subcontractor and consultant claims) in accordance with a joint defense agreement. To the greatest extent possible, the Parties will jointly address, investigate, manage, defend, settle and/or otherwise resolve all third party claims arising from or related to the Project or this Agreement subject to applicable legal and ethical considerations including the need for independent legal counsel. If the Parties determine that legal counsel is required to settle the claim, and that it is in their best interest to provide a joint defense, the Parties will execute any required conflict waivers associated with using the same legal counsel and enter into a joint defense agreement establishing the procedures and rights of the Parties.

14 WARRANTY

14.1 Contractor warrants all construction work for a period of 1 year commencing from the Substantial Completion Date of the Project or the date of repair, whichever is later, and for longer periods specified in the Implementation Documents for certain equipment manufacturers or suppliers. The Contractor will repair or replace any and all deficient or defective construction work, provided that the work was properly maintained and/or used, together with any other work that is displaced during repair or replacement without expense to Owner. Contractor's warranty excludes improper or insufficient maintenance, improper operation, normal wear and tear and normal usage. Contractor will procure all subcontractor and manufacturer express warranties required under the Implementation Documents on the Owner's behalf and will transmit the warranties to Owner before Final Completion and Project close-out. Establishment of the 1 year express warranty period for correction of construction work relates only to the specific obligation of the Contractor to correct defective or non-conforming work, and has no relationship to statute of limitations periods for legal claims arising from this Agreement.

15 DISPUTE RESOLUTION

15.1 Scope

All Disputes between the Parties arising from or in connection with this Agreement will be resolved as provided in this Section.

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15.2 Continued Performance

At all times during the pendency of a Dispute or a Dispute Resolution Proceeding, Work will continue. Provided the Owner continues to comply with its obligations under this Agreement, the parties to the Dispute Resolution Proceeding will continue to comply with any Owner's Directives.

15.3 Disputes

The Parties have waived all claims between themselves, subject only to those exceptions set forth in Section 13.2 and the indemnification provisions in Section 13.4. Nonetheless, issues may arise with regard to such exceptions or to the interpretation of this Agreement that require resolution between the Parties. Only the following claims may be made pursuant to this Section as all other claims, disputes and matters in controversy have been waived by the Parties:

15.3.1 Claims related to determination of the dates for Substantial and Final Completion;

15.3.2 Claims related to application of the Incentive Compensation Layer;

15.3.3 Claims for Allowable Costs;

15.3.4 Claims for unresolved Change Order Requests under Article 12;

15.3.5 Claims for indemnification under Section 13.4;

15.3.6 Claims resulting from termination or suspension under Article 16; and

15.3.7 Third party claims by subcontractors or consultants.

15.4 Notice

A Party may initiate the dispute resolution procedures stated in this Section by providing all PMT members with written notice of a potential Dispute which specifies in reasonable detail the basis of the Dispute and the remedy sought. Notice of a Dispute will occur within _____ calendar days following the occurrence of the event or condition or circumstance giving rise to the Dispute. Under no circumstances will a claim be made if it is barred by applicable statutes of limitation and/or repose.

15.5 Senior Representative Meeting

If the PMT is unable to resolve the Dispute, any party may request Senior Management Representatives to meet with the PMT and attempt in good faith to resolve the Dispute. Senior Management Representative from each PMT member will then review the claim in detail and meet face-to-face to discuss and resolve the matter (**Senior Representative Meeting**). This Senior Representative Meeting will occur no later than 14 calendar days after the PMT has declared an impasse in its efforts to resolve the dispute, unless the Parties agree upon a longer period of time. This meeting will be for the express purposes of: (i) exchanging and reviewing all pertinent non-privileged documents and information relating to the matters and issues in dispute; (ii) freely and candidly discussing each party's position; and (iii) reaching agreement upon a reasonable, compromise resolution of the Dispute. If during a Special Meeting a negotiated settlement is reached, the terms of the settlement will be recorded in a written Change Order signed by the parties.

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15.6 Mediation

If the dispute is not resolved by the conclusion of the Senior Representative Meeting, any party may request mediation of the Dispute in writing. If the Parties agrees to mediate, the mediation will be conducted by a third party mediator who is acceptable to all PMT members and experienced in resolving design and construction-related disputes on projects of similar type, sizes, quality and complexity. The mediator will be given written statement(s) by each Party and may inspect the Project site, Project Objective, Implementation Documents and other information reasonably required to understand the factual and legal basis of the Dispute. The mediator will schedule a mediation session within ___ days of the PMT's agreement to mediate. The mediation will be attended by representatives from each Party who has authority sufficient to resolve the Dispute, together with any other Party who has an interest in the Dispute. The cost of the mediation will be borne equally by the Parties involved in the Dispute. The mediation proceeding will be confidential and not admissible except as provided below. The mediation process must be completed within 60 calendar days of the initial PMT meeting regarding the Dispute, unless all Parties involved in the Dispute extend the mediation period. If, as a result of the mediation, a negotiated settlement is reached, the Parties will enter into a written settlement agreement that will be enforceable in a court of competent jurisdiction.

15.7 Arbitration

All Disputes arising out of or related to this Agreement that are not resolved will be subject to binding arbitration. Any party to the Dispute may serve the other Parties a written demand for arbitration within 30 calendar days after conclusion of mediation required under Section 15.6 or within the applicable statute of limitations if the claim were to be litigated, whichever is sooner. Disputes involving claims of $1,000,000 or less will be subject to arbitration before a single arbitrator. Those involving claims in excess of $1,000,000 will be subject to arbitration before a panel of 3 arbitrators. Within 15 calendar days after service of a demand for arbitration, the Parties or their attorneys will meet and confer in an attempt to select an arbitrator or arbitrators. If the Parties fail to reach agreement, the Party who served the demand for arbitration will file the demand with the American Arbitration Association and the Dispute will be resolved in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association. The parties further agree that this arbitration may include, by consolidation or joinder, consultants to Owner or Architect and subcontractors or suppliers to Contractor. The award rendered by the arbitrator or arbitrators will be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction.

16 DEFAULT, SUSPENSION AND TERMINATION

16.1 Termination for Convenience

The Owner may terminate this Agreement for convenience upon 30-days written notice at any time before 75% completion of construction of the Project.

16.1.1 Notice

The notice will state the extent and effective date of the termination, and on the effective date the PMT members affected will (i) to the extent directed, stop Services under this Agreement; (ii)

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terminate or assign all subcontract and consulting agreements to Owner unless otherwise directed; (iii) take other actions as may be necessary or requested by Owner to protect and preserve the Work and any other property in a PMT member's possession, in which Owner has or may acquire an interest.

16.1.2 Payment Upon Termination for Convenience

If the Owner terminates this Agreement for convenience, the Owner will pay the Architect and Contractor the (i) Allowable Costs incurred by the Architect and Contractor prior to the effective date of termination; (ii) all reimbursable expenses related to the termination and demobilization; and (iii) a portion of the ICL per Section 8 based on the percentage of the Project completed, as determined by the Independent Assessor, prior to termination. In no event will the total amount paid to the Architect and Contractor exceed the VTC. Any payment under this Section is subject to Owner's receipt of all requested statutory lien waiver and release forms as well as other documentation required for payment under Section 10.5, subject to withholding by Owner for reasons and in the manner provided in connection with Final Payment. Any dispute over the amount to be paid upon termination will be resolved in accordance with the Dispute Resolution Procedures set forth in Section 15.

16.2 Suspension

The Owner may, without cause, order the PMT to suspend, delay or interrupt the Project for as long as the Owner may determine. In the event the Project is suspended pursuant to this Section, the VTS will be extended for a period reasonably caused by the suspension. In the event the suspension results in an increase in the cost of the Project, the VTC will also be increased by the amount reasonably caused by the suspension. No adjustment will be made to the extent that performance was suspended, delayed or interrupted by acts or omissions of the Architect, Contractor, or any entity or persons working directly for either of them and for whom they are responsible. In the event the suspension of the Project is longer than 45 consecutive days, the Agreement will terminate automatically unless the Owner provides for reinstatement.

16.3 Owner Termination for Cause

The Owner will have the right to terminate this Agreement, or a Party to this Agreement, upon 15 calendar days written notice, and an additional 15 calendar days to cure, in the event of any of the following. The effective date of termination will be 30 calendar days from the date of the Notice.

16.3.1 Failure of one or more Parties to this Agreement to provide adequate labor and resources to achieve the VTS and VTC;

16.3.2 Refusal by a Party to rectify Work that is not in accordance with this Agreement, the Project Objective, and Implementation Documents;

16.3.3 Failure of a Party to work cooperatively with the PMT for the benefit of the Project;

16.3.4 Failure of the Architect and/or Contractor to properly pay their respective subcontractors, suppliers and consultants;

16.3.5 Bankruptcy or insolvency of a Party to this Agreement;

16.3.6 Acts of Willful Default;

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16.4 Architect/Contractor Termination for Cause

The Architect and/or Contractor may terminate this Agreement for cause upon 15 calendar days notice and an additional 15 calendar days to cure if any of the following occur: (i) The Owner fails to pay undisputed amounts due pursuant to this Agreement; (ii) Owner's suspension of the Project under Section 16.2 exceeds 45 consecutive days; or (iii) Willful Default.

16.4.1 Effective Date

Termination is effective 30 days after the date on the notice.

16.4.2 Payment

If the Agreement is terminated, the Owner will pay the Architect and Contractor the (i) Allowable Costs incurred by the Architect and Contractor prior to the effective date of termination; (ii) all reimbursable expenses related to the termination and demobilization; and (iii) a portion of the ICL per Section 8 based on the percentage of the Project completed, as determined by the PMT or the Independent Assessor, if the PMT is unable to agree, prior to termination. Any payment under this Section is subject to Owner's receipt of all requested statutory lien waiver and release forms as well as other documentation required for payment under Section 10.5. Any dispute over the amount to be paid upon termination will be resolved in accordance with the Dispute Resolution Procedures set forth in Section 15.

17 MISCELLANEOUS PROVISIONS

17.1 License

The Architect and Contractor represent that they are properly licensed in the Project State to perform the Work required under this Agreement and the Implementation Documents, and that each Party's business entity, is in good standing and qualified to do business in the Project State.

17.2 Standard of Care

The Architect will perform its services using that skill and care used by other competent Architects skilled in designing projects similar to this Project. Contractor will perform all Work using its best skill and attention and all Work will be performed in a timely workman-like manner consistent with the degree of care and skill customarily exercised by contractors constructing facilities of this size, and complexity in the location where the Project is situated. All Work performed in connection with this Agreement must be in accord with all applicable laws, ordinances, rules, regulations and lawful orders of public authorities. No party assumes any responsibility for tasks outside of its professional expertise or capability and outside of the scope of its license.

17.3 Notices

Any notice required to be given by this Agreement will be in writing and deemed effective upon personal delivery, or 1 business day after being sent via registered or certified mail return receipt requested or by overnight commercial courier providing next business day delivery and addressed to the following respective parties:

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Owner:
[name]
[address]
[city]

Architect:
[name]
[address]
[city]

Contractor:
[name]
[address]
[city]

17.4 Governing Law

This Agreement will be governed and construed in accordance with the laws of the Project State without giving effect to any choice of law rule that would cause the application of the laws of any other jurisdiction.

17.5 Commencement of Statute of Limitations

Causes of action between the Parties to this Agreement pertaining to acts or failures to act will be deemed to have accrued and the applicable statutes of limitations will commence to run not later than either the date of Substantial Completion for the Project, or the date of a recorded Notice of Completion, whichever is later.

17.6 No Solicitation of Employees

Owner will not solicit or employ any of Contractor's or Architects personnel for the duration of the Project and then for a period of 1 year after Final Completion.

17.7 Assignment

The Parties respectively bind themselves, their partners, successors, assigns and legal representatives to the other Parties to this Agreement. Neither Owner, Contractor or Architect will assign this Agreement without the written consent of the other Parties.

17.8 Severability

The terms and conditions of this Agreement will be interpreted in accordance with their plain meaning, and not strictly for or against any Party. Any rule of construction or interpretation to the contrary will be of no force or effect with respect to this Agreement. If a court of competent jurisdiction finds any term or provision of this Agreement to be void or unenforceable for any reason the term or provision

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will be deemed severed, and the remainder of the Agreement will remain in full force and effect according to its terms and provisions, to the maximum extent permitted by law.

17.9 No Third Party Beneficiaries

Nothing contained in this Agreement creates a contractual relationship with, or a cause of action in favor of a third party against, either the Owner, Architect or Contractor. The Parties acknowledge and agree that the obligations of the Architect and Contractor are solely for the benefit of the Owner and are not intended in any respect to benefit any third parties.

17.10 Rights and Remedies

Duties and obligations imposed by the Implementation Documents and the rights and remedies available thereunder will be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law or in equity.

17.11 Survival

The following provisions will survive the termination or expiration of this Agreement: (i) Waiver of liability under Sections 13.1 and 13.2; (ii) Insurance requirements under Section 13.3 and **Exhibit H**; (iii) Indemnity provisions under Section 13.4; (iv) warranty obligations under Section 14; and (v) the Dispute Resolution Process under Section 15.

17.12 Waiver

No action or failure to act by a Party will constitute a waiver of a right or duty afforded them under this Agreement, nor will such action or failure to act constitute approval of or acquiescence in a breach of this Agreement, unless specifically agreed to in writing by the Parties.

17.13 Execution

By executing this Agreement, each of the individuals represent that he or she has authority to bind the Party on whose behalf his or her execution is made.

17.14 Counterparts

This Agreement may be executed simultaneously in multiple counterparts, each of which will be deemed an original. When proving this Agreement, it will only be necessary to produce or account for the counterpart signed by the party against whom enforcement is sought.

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17.15 Exhibits

The Exhibits referred to in this Agreement and listed below are incorporated into this Agreement by reference as though set forth in full:

A	Definitions
B	Project Value Proposition
B.1	Sponsor's criteria
B.2	Project definition
B.3	Project goals
C	Project Objective and ICL
D	Contract Task Matrix
E	Management Protocols
E.1	PMT Work Plan
E.2	Cost Management Strategy
E.3	Staffing Plan
E.4	BIM Workflow Plan
F	Digital Data Protocol
G	Allowable Costs
G.1	Architect's Allowable Costs
G.2	Contractor's Allowable Costs
H	Insurance

17.16 Entire Agreement

This Agreement constitutes the entire integrated agreement between the Parties and supersedes all prior oral and written negotiations, representations or agreements by the Parties with respect to this subject matter.

This Agreement is entered into as of the Effective Date first written above.

Owner
By:_____
Name:_____
Title:_____

Contractor
By:_____
Name:_____
Title:_____

Contractor State License No.:_____

Architect
By:_____
Name:_____

This IPD Agreement template is based on following publications:

AIA. (2009). *Document C191 ™ - 2009*. Retrieved from http://www.aia.org/groups/aia/documents/pdf/aiab081495.pdf

HansonBridgett LLP. (2010). *Integrated Project Delivery Agreement*. Retrieved from https://www.usgbc-ncc.org/storage/documents/Presentations/SF/2010-1-26_hanson_bridgett_standard_ipd__agreement.pdf

B. IPD Agreement Exhibits - Template

[PROJECT NAME]

INTEGRATED PROJECT DELIVERY AGREEMENT

EXHIBITS

Exhibit A – Definitions

Exhibit B – Project Value Proposition

Exhibit B.1 – Sponsor's Criteria

Exhibit B.2 – Project definition

Exhibit B.3 – Project Goals

Exhibit C – Project Objective and ICL

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Exhibit E – Management Protocols

Exhibit E.1 – PMT Work Plan

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Exhibit E.3 – Staffing Plan

Exhibit E.4 – BIM Workflow Plan

Exhibit F – Digital Data Protocol

Exhibit G – Allowable Costs

Exhibit G.1 – Architect's Allowable Costs

Exhibit G.2 – Contractor's Allowable Costs

Exhibit H – Insurance

General Conditions of the Integrated Project Delivery Agreement

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HansonBridgett LLP. (2010). *Integrated Project Delivery Agreement*. Retrieved from https://www.usgbc-ncc.org/storage/documents/Presentations/SF/2010-1-26_hanson_bridgett_standard_ipd__agreement.pdf

Exhibit A – Definitions

"Adverse Weather" is inclement temperatures, wind or rain that prevents or substantially impedes the Contractor's ability to perform construction work and impacts the critical path of the VTS causing a delay in the Contract Time. Work is substantially impeded if the Contractor loses more than half of a planned and otherwise available workday. The VTS assumes ____ Adverse Weather days.

"Agreement" means the Integrated Project Delivery Agreement executed by the Parties, all of the Exhibits referenced in the Agreement, and the General Conditions to the Agreement.

"Allowable Costs" includes all Architect and Contractor costs incurred in the performance of the Work (excluding profit) as more specifically defined in Exhibits H and I. The Architect and Contractor will endeavor exclude profit or contingency from Allowable Costs of any subcontractors and consultants.

"Building Information Model" (BIM) or "Model" is a parametric, computable representation of the Project design developed by the Architect, its consultants, and any design/build subcontractors, and includes construction details developed by the Parties and their respective consultants and subcontractors. As used in this Agreement, references to Building Information Model, BIM, or the Model, include the primary design model or models and all linked, related, affiliated or subsidiary models developed for design, estimating, detailing, fabrication, or construction of the Project, or any portion or element of the Project. The portions of the BIM prepared by the Architect, its consultants and the design/build subcontractors are Contract Documents. The portions of the BIM prepared by the Contractor or its subcontractors to illustrate how they will construct, fabricate or install the Project are contractor submittals detailing how they will implement the Contract Documents.

"Close-Out Documents" include Operation and Maintenance manuals, as-built drawings, the Record Model, warranties, keying schedules, attic stock and any other close-out documentation required under the Agreement and Implementation Documents.

"Contract Documents" include the Agreement, the Building Information Model, the Implementation Documents, and all other documents issued by the Architect and design/build subcontractors for construction of this Project, and any subsequent modifications and/or Change Orders. The documents included in the Contract Documents are complementary and what is required by one is required by all. If there are conflicting requirements between the various documents, the PMT will determine which requirements will better achieve the Project Objective set forth in Exhibit B.

"Contract Tasks" are the performance obligations of each Party, as described in the Contract Task Matrix set forth in Exhibit C.

"Cost Reimbursable Consultants" may be engaged by the Architect to perform portions of the Work per the obligations stated in their consulting agreements and will share in the risk and rewards of Project's success by: (1) placing a portion of their profit at risk to help fund the Architect's Incentive Compensation Layer contribution; (2) receiving an agreed portion of the Architect's distribution of the Incentive Compensation Layer at Final Payment, and (3) being included within the waiver of liability and indemnity provisions set forth in the Agreement.

This IPD Agreement template is based on following publications:

AIA. (2009). *Document C191 ™ - 2009*. Retrieved from http://www.aia.org/groups/aia/documents/pdf/aiab081495.pdf

HansonBridgett LLP. (2010). *Integrated Project Delivery Agreement*. Retrieved from https://www.usgbc-ncc.org/storage/documents/Presentations/SF/2010-1-26_hanson_bridgett_standard_ipd__agreement.pdf

"Cost Reimbursable Subcontractors" refers to all subcontractors engaged by the Contractor on a cost reimbursable basis. Cost Reimbursable Subcontractors will perform the obligations stated in their subcontract with the Contractor and will share in the risk and rewards of Project's success by: (1) placing a portion of their profit at risk to help fund the Contractor's Incentive Compensation Layer contribution; (2) receiving an agreed portion of the Contractor's distribution of the Incentive Compensation Layer at Final Payment; and (3) being included within the waiver of liability and indemnity provisions set forth in the Agreement.

"Final Completion" occurs on the date when all Work has been completed in accordance with the Contract Documents; all punch list items have been completed and accepted by the PMT; the Project has been commissioned; all Close-Out Documents have been transmitted to the Owner; and a certificate of occupancy has been issued by the public agency having jurisdiction over construction of the Project.

"Final Payment" means Owner's payment of all amounts due and owing to the Architect and Contractor, including ICL, after Final Completion of the Project and receipt of all required lien waivers and releases.

"Fixed-Price" refers to subcontractors engaged by the Contractor or consultants engaged by the Architect on a fixed-price basis. Fixed-price subcontractors and consultants do not place a portion of their profit at risk and they do not share in the distribution of the ICL or the waiver of liability.

"Force Majeure" means a natural disasters; labor strikes that cannot be resolved through a dual gate or other measures; disruptions in utility service and/or connections not caused by the Contractor; governmental agency actions other than permitting, design review or inspection of construction; civil disobedience, an act of terror, or unavoidable casualties or catastrophic events beyond the Architect and Contractor's control, and not due to any act or omission of the Architect and/or Contractor, that impacts the critical path of the VTS and extends the Contract Time.

"Governmental Authority" or "Governmental Authorities" include all Federal, State, County or Municipal boards, departments, offices or agencies that have jurisdiction over the project and whose approval is required for the design, construction or use of the project.

"Incentive Compensation Layer" (**ICL**) is a fund that is increased or decreased based on Project outcome that is distributed upon Final Completion to the Architect, Contractor, and their respective Cost-Reimbursable Subcontractors and Cost Reimbursable Consultants in accordance with their respective percentages. Payment of the ICL is contingent upon achieving the aesthetic, environmental and functional goals of the Project Objective and Implementation Documents, the VTP, VTC and VTS, which cannot be sacrificed to increase the amount of ICL funds available. Design and construction innovations that are consistent with the Project Object and VTP, and reduce cost or schedule without sacrificing quality, can increase the ICL funds available for distribution.

"Notice to Proceed" is a written document issued by the Owner or the PMT to set the date of commencement of the Project.

"Owner's Directive" is a written directive from the Owner that directs Work that is not required by the Project Objective or Implementation Documents and is opposed by either the Architect and/or Contractor. An Owner's Directive may affect the VTC and/or VTS.

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"PMT Directive" is a written directive from the Project Management Team derived from a unanimous vote that affects reallocation of the Work, design, cost and/or schedule. A PMT Directive may affect the VTC and/or VTS.

"Project Objective" is a jointly agreed statement of the functional, aesthetic, environmental and business goals that this Project seeks to achieve and is comprised of the VTP, VTC and VTS. The Project Objective guides the Parties in developing and implementing the Project design and is the primary standard for measuring project success. Achieving the Project Objective requires achieving the goals set in each of its component parts.

"Project State" means the state where the Project is located.

"Record Model" is the version of the BIM that has been updated to reflect the as-built condition of the Project at Final Completion.

"Senior Representative Meeting" is a meeting of the Senior Representatives that has been called to resolve an issue that the PMT could not resolve.

"Substantial Completion" occurs on the date when the Project is sufficiently complete to allow the Owner to occupy or utilize the Project for its intended purpose, all systems are operational as designed or required, all inspections and tests required under the Contract Documents have been completed successfully, and all governmental agencies have issued approval for occupancy.

"Target Value Design" is a forward focused design process that uses constructability and cost information from key project participants before the design is developed, together with rapid evaluation of cost impacts as design decisions are made, to allow designing to a cost target.

"Unforeseen and Differing Site Conditions" means discovery of an unknown, subsurface or otherwise concealed physical condition that differs materially from those indicated in the Implementation Documents; an unknown physical condition of an unusual nature that differs materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character and nature provided for in the Implementation Documents; or an unknown, existing hazardous substance that requires removal or remediation.

"Validated Target Cost" (**VTC**) is the amount that the PMT believes is sufficient to achieve design and construction of Project in accordance with the Validated Target Program and within the Validated Target Schedule. The VTC is determined by the PMT during the Conceptualization Phase of the Project and is a part of the Project Objective. The VTC measures whether the Project meets the Owner's financial expectations and is a factor in determining the amount of ICL funds paid to the Architect, Contractor and their respective Cost Reimbursable Subcontractors and Cost Reimbursable Consultants.

"Validated Target Program" (**VTP**) defines the final quality, quantity, functionality, aesthetics, sustainability and other requirements for the Project that are confirmed by the PMT during the Conceptualization Phase. The Project scope includes all elements explicitly included in the VTP and those that are reasonably necessary to accomplish the VTP.

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HansonBridgett LLP. (2010). *Integrated Project Delivery Agreement*. Retrieved from https://www.usgbc-ncc.org/storage/documents/Presentations/SF/2010-1-26_hanson_bridgett_standard_ipd__agreement.pdf

"Validated Target Schedule" (**VTS**) is the baseline critical path schedule for the Project that defines the Contract Time and is unanimously agreed to by the PMT during the Conceptualization Phase. The VTS will include all major components of the design and construction work including governmental agency deadlines, procurement, submittal and long lead item schedules, construction work by trade and the Owner's occupancy requirements projecting a milestone Substantial Completion Date and Final Completion Date.

"Willful Default" is a default by a Party to the Agreement caused by one of the following events: (i) actual or constructive abandonment of the Project; (ii) failure of a Party to correct Work that significantly and materially deviates from the Implementation Document or applicable laws, codes or regulations; (iii) fraud, gross negligence or willful misconduct. Actual abandonment occurs if the Contractor or Architect, without legal justification, ceases performing Work for a period of 21 consecutive days. Constructive abandonment occurs if the Contractor or Architect, without justification, expends so little effort on the Project that there is no meaningful progress.

"Work" includes all design services necessary to meet the Project Objective, all labor, materials, equipment and appurtenances required to construct the Project in accordance with the Contract Documents, and commissioning of the Project.

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HansonBridgett LLP. (2010). *Integrated Project Delivery Agreement*. Retrieved from https://www.usgbc-ncc.org/storage/documents/Presentations/SF/2010-1-26_hanson_bridgett_standard_ipd__agreement.pdf

Exhibit B – Project Value Proposition

Exhibit B.1 – Sponsor's Criteria

The Owner's program for the Project:
(Identify documentation or state the manner in which the program will be developed.)

The Project's physical characteristics:
(Identify or describe, if appropriate, size, location, dimensions, or other pertinent information, such as geotechnical reports; site, boundary and topographic surveys; traffic and utility studies; availability of public and private utilities and services; legal description of the site; etc.)

The Owner's budget to plan, design, construct, commission and otherwise complete the Project, not including costs of land, rights-of-way, financing, marketing, and other such costs:
(Provide total, and if known, a line item breakdown.)

The Owner's anticipated scheduling information:

Other Project information:
(Identify special characteristics or needs of the Project not provided elsewhere, such as environmentally responsible design, or historic preservation requirements.)

Exhibit B.2 – Project definition

Project Criteria:

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HansonBridgett LLP. (2010). *Integrated Project Delivery Agreement*. Retrieved from https://www.usgbc-ncc.org/storage/documents/Presentations/SF/2010-1-26_hanson_bridgett_standard_ipd__agreement.pdf

(Identify documentation describing the mutually agreed-upon Project Criteria, based on the Sponsor's Criteria.)

Project program:
(Identify documentation describing the Project program.)

Project site information:
(Identify or describe, if appropriate, size, location, dimensions, or other pertinent information such as geotechnical reports; site, boundary and topographic surveys; traffic and utility studies; availability of public and private utilities and services; legal description of the site, etc.)

Project regulatory information:
(Identify or describe, if appropriate, land use, zoning, building and infrastructure codes and the agencies or authorities having jurisdiction over the Project.)

Project Criteria Design:
(Identify documentation describing the Project Criteria Design including Models, Drawings, Specifications and other design documents; product data; initial building systems; energy budgets; etc.)

PROJECT PARTICIPANTS

The Owner will retain the following Consultants and contractors:
(List discipline and, if known, identify Consultants and contractors by name and address.)

The Architect will retain the following Consultants:
(List discipline and, if known, identify Consultants by name and address.)

The Contractor will retain the following Consultants and contractors:
(List discipline and, if known, identify Consultants and contractors by name and address.)

Other Parties will retain the following Consultants and contractors:
(Identify the Party by name and address, and for each Party, list the discipline of any Consultant or contractor it will retain and, if known, identify them by name and address.)

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HansonBridgett LLP. (2010). *Integrated Project Delivery Agreement*. Retrieved from https://www.usgbc-ncc.org/storage/documents/Presentations/SF/2010-1-26_hanson_bridgett_standard_ipd__agreement.pdf

Exhibit B.3 – Project Goals

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Exhibit C – Project Objective and ICL

1 PROJECT OBJECTIVE

The Project Objective is comprised of the Validated Target Cost (VTC), Validated Target Schedule (VTS); and the Validated Target Program (VTP).

1.1 The Validated Target Cost is $_____. The VTC is further detailed in _____.

1.2 The Validated Target Schedule consists of the Substantial Completion date of _____ and the Final Completion date of _____. The VTS is further detailed in the baseline schedule dated _____.

1.3 The Validated Target Program consists of the report dated _____, drawings _____ dated _____, and the _____ file dated _____ all of which are complementary.

2 INCENTIVE COMPENSATION LAYER

2.1 The base Incentive Compensation Layer (ICL) is $_____ and will be adjusted, as described in the Agreement prior to distribution to Architect and Contractor in accordance with their applicable ICL percentages.

2.2 The Architect's percentage of the ICL is _____. The Architect will share its portion of the ICL with its Cost Reimbursable Consultants in percentages agreed between the Architect and the Cost Reimbursable Consultants.

2.3 The Contractor's percentage of the ICL is _____. The Contractor will share its portion of the ICL with its Cost Reimbursable Subcontractors in percentages agreed between the Architect and the Cost Reimbursable Subcontractors.

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Exhibit D – Contract Task Matrix

1 MATRIX KEY

"S" indicates Sole responsibility for the task.

"P" indicates Primary responsibility for the task. Parties with primary responsibility are responsible for the task, but will be assisted by others.

"J" indicates Joint responsibility. Parties with Joint responsibility are equally responsible for the task.

"C" indicates Contributing responsibility. Parties with contributing responsibility participate in a task, but are not jointly responsible.

"DA" indicates Design Assist responsibility. Contractor and subcontractors with design assist responsibility will assist the design team by providing constructability and cost consultation and analysis, but do not have responsible charge of the elements being designed.

"DB" indicates Design/Build. Contractor and subcontractors with design/build responsibility for the design, engineering, detailing and implementation of a building component system are responsible for coordinating the design/build component or system within the overall project design. The Design/Builder will be the architect or engineer of record or will retain licensed professionals to perform all design services.

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2 CONTRACT TASK MATRIX

Project Task	OWNER	ARCHITECT	CONTRACTOR	OTHER	OTHER
General					
Building Information Model					
Conceptualization					
Criteria Design					
Detailed Design					
Implementation Documents					
Agency Review					
Project Purchasing					
Construction and Administration					
Commissioning and Closeout					

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Exhibit E – Management Protocols

Exhibit E.1 – PMT Work Plan

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Exhibit E.2 – Cost Management Strategy

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Exhibit E.3 – Staffing Plan

Exhibit E.4 – BIM Workflow Plan

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Exhibit F – Digital Data Protocol

Digital Data	Data Format	Transmitting Party	Transmission Method	Receiving Party	Permitted Uses	Notes
Project Agreements and Modifications						
Project Communications						
General Communications						
Meeting notices						
Agendas						
Minutes						
Request for information						
Other						
Architect's pre-construction submittals						
Schematic Design Documents						
Design Development Documents						
Construction Documents						
Architect's Drawings and Specifications						
Contract Documents						
Drawings						
Specifications						
Other						
Contractor's submittals						
Product Data						
Submitted by Contractor						
Returned by Architect						
Shop drawings						
Submitted by Contractor						
Returned by Architect						
Other submittals						
Subcontractor's submittals						
Product Data						
Submitted by Subcontractor						
Returned by Contractor						
Shop drawings						
Submitted by Subcontractor						
Returned by Contractor						
Other submittals						
Modifications						
Architect's Supplemental Instructions						
Request for proposal						
Proposal						
Modification communications						
Project payment documents						
Notices and Claims						
Other						
Closeout documents						

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Record documents						

Legend:

Data format	Transmitting Party	Transmission method	Receiving Party	Permitted Uses
W = .docx DWG = AutoCad X = .xls	O = Sponsor IPD – IPD Team RED A LA GC Sub	EM = via email EMA = attachment to an email CD = via compact disk PS = posted to project website FTP = FTP transfer to receiving FTP server	O = Sponsor IPD – IPD Team RED A LA GC Sub	S = store and view only R = reproduce and distribute I = Integrate (incorporate additional digital data without modifying data received) M = modify as required to fulfill obligations for the Project

This IPD Agreement template is based on following publications:

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HansonBridgett LLP. (2010). *Integrated Project Delivery Agreement*. Retrieved from https://www.usgbc-ncc.org/storage/documents/Presentations/SF/2010-1-26_hanson_bridgett_standard_ipd__agreement.pdf

Exhibit G – Allowable Costs

Exhibit G.1 – Architect's Allowable Costs

1 GENERAL

Architect's Allowable Costs are only those costs reasonably and necessarily incurred by Architect in performance of its obligations under this Agreement and consist of the following categories of items.

2 HOURLY RATES OF ARCHITECT'S EMPLOYEES AND COST REIMBURSABLE CONSULTANTS

The allowable cost for Architect's employees and the employees of Cost Reimbursable Consultants will be charged at the product of the employee's direct salary cost and the agreed multipliers. The Multiplier to VTC is used until the sum of Contractor and Architect's Allowable Costs equals the VTC and the Multiplier after VTC is used thereafter. The direct salary cost is the amount paid to the employee as wages, exclusive of any benefits, taxes, or profit sharing plans.

Firm	Multiplier to VTC	Multiplier after VTC
Architect	____%	____%
Structural Engineer	____%	____%
Mechanical Engineer	____%	____%
Electrical Engineer	____%	____%
Other	____%	____%

3 COST OF CONSULTANTS

Amounts paid by Architect to consultants for services directly related to this Project without mark-up. The invoices of Cost Reimbursable Consultants will be calculated using each employee's direct salary cost and the firm's multiplier as listed in Section 2 above.

4 ACTIONS BY OR AGAINST FIXED PRICE CONSULTANTS

If any action is instituted by or against a Fixed Price Consultant with the concurrence of the PMT, the amount of any payment to the Fixed Price Consultant, and the legal fees and costs incurred in defending or prosecuting the action are Allowable Costs. If there is a financial recovery against a Fixed Price Consultant, the net recovery (actual recovery less prosecution costs) will be paid to the Owner. Any net recovery will first be used to pay for remedying or replacing the Fixed Price Consultant's deficient services or any loss caused by those services. Any amount of net recovery remaining is then paid to Owner and used to pay Architect's and/or Contractor's Allowable Costs.

5 REIMBURSABLE EXPENSES

The following reimbursable expenses are Allowable Costs at the rates agreed below:

Item	Rate

6 TRAVEL EXPENSES

Travel expenses necessary for the Project and incurred with the concurrence of the PMT are reimbursable as Allowable Costs. Air travel is at economy rates unless the travel exceeds 6 aloft hours, in which case travel may be at business class, or if business class is not available, first class. Food and lodging will be reimbursed as Allowable Costs, but the PMT may establish a per diem rate for food and lodging as an alternative to actual costs.

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Exhibit G.2 – Contractor's Allowable Costs

1 GENERAL

The Contractor's Allowable Costs are limited to those costs reasonably and necessarily incurred by Contractor in performance of its obligations under the Agreement, and that are consist with the following categories of items.

2 DIRECT COSTS

2.1 **Direct Costs.** The term **"Direct Costs"** means all Labor**,** material, equipment, appurtenances, and **"Miscellaneous Costs"** necessarily incurred by the Contractor for the proper performance of the construction work in strict accordance with the Contract Documents.

2.2 Labor.

2.2.1 **Field Labor.** Field Labor includes all labor performed by workers directly employed by the Contractor to perform construction work on-site as documented [by weekly certified] payroll reports or written subcontract.

2.2.2 **Subcontractor Costs.** Payments made by Contractor to subcontractors or design consultants in accordance with the requirements of their written subcontract agreements. All written Cost Reimbursable Subcontracts or Cost Reimbursable Consulting agreements will include an Allowable Cost section that specifically defines the categories of labor and the rates in dollar amount per hour.

2.3 Materials and Equipment Incorporated into The Project.

2.3.1 Costs, including transportation and storage, of materials and equipment incorporated or to be incorporated into the Project.

2.3.2 Costs of materials described in Section 2.3.1 in excess of those actually installed to allow for reasonable waste and spoilage. Unused excess materials, if any, will become the Owner's property at Final Completion or, at the Owner's option, will be sold by the Contractor. Any amounts realized from the sales will be credited to the Owner.

2.4 Other Materials and Equipment, Temporary Facilities and Related Items.

2.4.1 Costs, including transportation and storage, installation, maintenance, dismantling and removal of construction materials, supplies, temporary facilities, communication radios (direct-connect), machinery, equipment, and hand tools not customarily owned by field labor, that are provided by the Contractor at the site and fully consumed in the performance of the construction work. If items are not fully consumed, the cost less salvage value, whether sold to others or retained by the Contractor, will be included. Salvage value will be the fair market value.

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2.4.2 All rental charges for items included in Section 2.4.1 that are provided by the Contractor at the site, whether rented from the Contractor or others, including costs for transportation, installation, minor repairs and replacements, dismantling and removal provided that such costs: (i) do not exceed 50% of the cost of purchasing the equipment, and the rental rates (exclusive of all installation, maintenance, dismantling, removal, transportation and delivery costs) for the equipment do not exceed 85% of the lower of the Associated Equipment Distributors value or Blue Book Value, of the equipment; and (ii) all equipment owned by the Contractor or any affiliate of Contractor, if intended for rental, will receive prior written approval of the PMT before being allowed as an Allowable Cost. Rates for equipment that is owned by the Contractor or an affiliate and rented will be subject to the PMT's prior approval and will be at rental rates consistent with those prevailing in the area.

2.4.3 Costs of materials and equipment suitably stored off-site at a mutually acceptable location, if approved in advance by the PMT.

2.5 Miscellaneous Costs.

2.5.1.1 Sales, use, gross receipt, or similar taxes imposed by a governmental authority that are related to the construction work.

2.5.1.2 Fees and assessments for the building permit and for other permits, licenses and inspections that Contractor is required to pay under the Contract Documents. Documents. design, process or product required by the Contract Documents.

2.5.1.3 Fees of laboratories for tests required by the Contract.

2.5.1.4 All royalties and license fees paid for the use of a particular.

2.5.1.5 Costs of removal and disposal of debris from the site and recycle costs not offset by recycle fees or rebates as required by any Sustainability requirements set forth in the General Conditions.

2.5.1.6 Cost of document reproduction necessary for proper execution of the construction work.

2.5.1.7 That portion of the reasonable expenses of the Contractor's personnel incurred while traveling in discharge of duties connected with the Work in excess of 50 miles or $200 if approved in advance by the PMT.

2.5.1.8 Costs incurred in taking action to prevent threatened damage, injury, or loss in case of an emergency that threatens the safety of persons and/or property as directed by the PMT.

2.5.1.9 Actions instituted by or against a Fixed Price subcontractor with the concurrence of the PMT, the amount of any payment to the Fixed Price subcontractor, and the legal fees and costs incurred in defending or prosecuting the action. If there is a financial recovery against a Fixed Price subcontractor, the net recovery (actual recovery less prosecution costs) will be included in the VTP. Any net recovery will first be used to pay for remedying or replacing the Fixed Price subcontractor's deficient work or any loss caused by that work. Any amount of net recovery remaining will be placed in the VTP.

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2.5.2 Cost of repairing or correcting damaged or non-conforming construction work executed by the Contractor, its subcontractors or suppliers, provided that the damaged or non-conforming work was not caused by negligence or failure to fulfill a specific responsibility of the Contract Documents and only to the extent that the cost of repair or correction is not recoverable by the Contractor's or its subcontractor's insurance or sureties.

2.5.3 Cash discounts obtained on payments made by the Contractor will accrue to the VTP. Trade discounts, rebates, refunds and amounts received from sales of surplus materials and equipment will likewise accrue to the VTP.

3 INDIRECT COSTS

3.1 Labor for Contractor's project management, superintending, preconstruction services, accounting, engineering, design, planning and scheduling, purchasing, estimating, accounting, IT, and data processing for payroll, payables and receivables specifically assigned to this Project, whether performed at the site or off-site offices.

3.2 Expenses associated with Contractor's on-site office such as temporary facilities (including trailers, power, utilities, telephone, internet), temporary office furniture and equipment (including cost of computers and software purchased solely for this Project with the concurrence of the PMT and inclusive of all software, applications, systems, and support), devices, servers, printers, copiers, plotters, cell phones, facsimile transmissions and long-distance telephone calls, postage and parcel delivery charges, digital cameras etc.; including costs of transportation, installation, minor repairs and replacements, dismantling and removal thereof.

3.3 General Requirement costs such temporary toilets, barricades, fences, security and site-safety.

3.4 Insurance expense allocable to this Project, including any required bonds and subcontractor default insurance.

3.5 Labor by Contractor's supervisory or administrative personnel engaged at factories, workshops or on the road, in expediting the production or transportation of materials or equipment required for the Work, with prior approval by the PMT.

4 FEE ON DIRECT AND INDIRECT COSTS

4.1 The Contractor's Allowable Costs will also receive a Fee as a percentage of the Direct and Indirect Costs. The percentage used depends on whether the VTC has been exceeded. The Cost Reimbursable Subcontractors' Allowable Costs are calculated using the Fee percentages below on the Cost Reimbursable Subcontractors' Direct and Indirect Costs.

Firm	Fee % if Project costs are below VTC	Fee % used after Project costs exceed VTC
Contractor	____%	____%
Cost Reimbursable Subcontractor 1	____%	____%
Cost Reimbursable Subcontractor 2	____%	____%

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Exhibit H – Insurance

1 PROVISIONS APPLICABLE TO ALL INSURANCE

1.1 Term of Insurance Policies.

All liability insurance must be in force prior to any Work under this Agreement and must be maintained in force for 2 years following Substantial Completion. Workers compensation insurance must be in force from the inception of this Agreement through Final Completion and Closeout. Builder's Risk insurance must be in force prior to commencement of construction and if equipment or material is purchased prior to construction, must either be in force prior to the purchase or the purchase must be insured against loss or damage under other property insurance.

1.2 Retroactive Date and Extended Reporting Period.

If any required insurance is issued or renewed on a claims-made form, the retroactive date for coverage will be no later than the commencement of design services for the Project and must state that, in the event of cancellation or non-renewal, the discovery period for insurance claims will be at least 3 years after cancellation or non-renewal.

1.3 Standard Forms.

To the extent applicable, the amounts and types of insurance will conform to the minimum terms, conditions, and coverages of the Insurance Service Office (ISO) policies, forms, and endorsements in effect when this Agreement is executed.

1.4 Admitted Carriers.

All insurance must be placed with insurers that are admitted and licensed to issue insurance in the state where the Project is located.

1.5 Insurer Ratings.

All insurance must be issued by insurers rated at least A, XII as rated in the most recent edition of Best's Insurance Reports

1.6 Insurance Certificates and Copies of Policies.

Prior to commencing any work or services under this Agreement, Architect and Contractor will provide owner with insurance certificates reflecting the insurance required by this Agreement. Upon written request, Architect and Contractor will provide Owner with complete copies of the insurance policies required by this Agreement. Receipt of insurance certificates or copies of policies without objection by Owner does not constitute acceptance or approval of insurance nor does it relieve Architect or Contractor from their respective obligations to provide the required insurance.

1.7 No Reduction, Modification or Cancellation of Coverage.

No insurance required by this Agreement may be reduced in coverage, modified or cancelled (except cancellation for non-payment of premium) without 30 days written notice to Owner. All policy renewals during the Term of Insurance Policies must be equal, or better, in terms and limits.

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1.8 Primary Insurance.

All liability policies required by this Agreement are primary to any similar insurance maintained by Owner for its own benefit.

1.9 Waivers of Subrogation.

All insurers providing insurance required by this Agreement must agree to waive subrogation against the Parties to this Agreement, the Cost Reimbursable Subcontractors and the Cost Reimbursable Consultants.

1.10 Deductibles and Self-Insured Retentions.

All deductibles and self-insured retentions are subject to approval by Owner, and unless approved in writing, are the sole responsibility of the first named insured and not Allowable Costs.
Architect's Allowable Costs are only those costs reasonably and necessarily incurred by Architect in performance of its obligations under this Agreement and consist of the following categories of items.

2 PROVISIONS APPLICABLE TO COMMERCIAL GENERAL LIABILITY, AUTOMOBILE INSURANCE POLICIES, AND UMBRELLA/EXCESS POLICIES.

2.1 Commercial General Liability (CGL).

Primary CGL coverage must be issued on policies at least as broad as the most current version of ISO form CG 00 01 with combined single limits in the amounts listed in Sections__ and with excess coverage in the amounts listed in Sections __. Coverage must include, but is not limited to:

2.1.1 Claims for damages caused by negligent acts, errors and omissions resulting in bodily injury, sickness, disease or death, personal injury, or injury to or destruction of property including loss of use resulting therefrom.

2.1.2 Contractual Liability.

2.1.3 Products/Completed Operations Liability Insurance

2.1.4 Broad Form Property Damage

2.1.5 Explosion, collapse and underground hazards, if such exposure exists

2.1.6 Independent subcontractors.

2.1.7 Severability of interests.

2.1.8 Cross Liability

2.1.9 Limited Pollution as provided on CG 00 01.

2.2 Automobile Liability.

Commercial Automobile Liability Insurance must cover accidents occurring on-site and off site with combined single limits and excess limits as stated in Section __ and Section __. This insurance must

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apply to all owned, leased, if any, non-owned or hired vehicles to be used by the insured in performance of its obligations under this Agreement. The insurance must include uninsured and underinsured coverage and any statutorily required "No Fault" benefits.

2.3 Umbrella/Excess Policies.

Umbrellas/Excess policies must be following form or written on policies with coverage at least as broad as each and every one of the underlying policies.

2.4 Occurrence Basis.

All Commercial General Liability, Commercial Automobile Liability and any Umbrella/Excess policies must be written on an occurrence basis.

2.5 Additional Insureds.

Owner, its directors, officers and employees will be included on Architect's and Contractor's Commercial General Liability, Commercial Automobile Policy and Excess/Umbrella Liability policies on a primary basis for work performed under or incident to this Agreement. If the additional insured has other insurance applicable to the loss, it will be on an excess or contingent basis. The form of additional insured endorsement on the
Commercial General Liability and Excess/Umbrella policies will be ISO CG 20 10 07 04 and ISO CG 20 37 07 04 or their equivalent and must be maintained for 2 years after Substantial Completion of the Project. The Architect, its directors, officers and employees will be included as additional insureds on the Contractor's policies to the same extent as Owner.

3 CONTRACTOR'S INSURANCE

3.1.1 Commercial General Liability

with combined single limits of _____.

3.1.2 Commercial Automobile Liability

with combined single limits of _____.

3.1.3 Excess/Umbrella

liability with limits of _____.

3.1.4 Professional Liability.

If Contractor or its subcontractors are engaged in design/build activities, it must have coverage for damages caused by negligent acts, errors or omissions arising out of the performance of professional services for which Contractor is legally liable with a minimum limit of _____, including pollution coverage and having a retroactive date preceding any design work by Contractor or its design/build subcontractors. In addition, Contractor must have Contractor's Professional Liability coverage with a minimum limit of _____ covering Contractor's pre-construction and design assist activities.

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3.1.5 Valuable Papers.

Insurance with limits of _____ covering loss, destruction, damage, injury or corruption of valuable papers, records, digital media, plans, specifications, drawings, CAD drawings, Building Information Models, reports, maps, books, blueprints, and other printed and electronic documents and data.

3.1.6 Workers Compensation.

Coverage for claims under applicable worker's compensation acts and under employer's liability, both with statutory minimum limits. Coverage must include:

3.1.6.1 Voluntary Compensation and EL Coverage Endorsement; and

3.1.6.2 Coverage for claims by employees under the U. S. Longshoremen's and Harbor Worker's Compensation Act, the Jones Act, or under laws, regulations or statutes applicable to maritime employees if the employees work is subject to the jurisdiction of those laws, regulations or statutes.

4 ARCHITECT'S INSURANCE

4.1.1 Commercial General Liability

with combined single limits of _____.

4.1.2 Commercial Automobile Liability

with combined single limits of _____.

4.1.3 Excess/Umbrella

liability with limits of _____.

4.1.4 Professional Liability.

Claims for damages caused by negligent acts, errors or omissions arising out of performance of professional services for which the Architect is legally liable, with a minimum limit of $_____, including but not limited to the following coverages:

4.1.4.1 Insured's interest in joint ventures, if applicable;

4.1.4.2 Pollution coverage;

4.1.4.3 Retroactive date prior to design work; and

4.1.4.4 If Project specific insurance is required, an extended reporting period of 3 years following substantial completion of construction.

4.1.5 Valuable Papers.

Insurance with limits of _____ covering loss, destruction, damage, injury or corruption of valuable papers, records, digital media, plans, specifications, drawings, CAD drawings, Building Information Models, reports, maps, books, blueprints, and other printed and electronic documents and data.

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4.1.6 Workers Compensation.

Coverage for claims under applicable worker's compensation acts and under employer's liability, both with statutory minimum limits. Coverage must include:

4.1.6.1 Voluntary Compensation and EL Coverage Endorsement; and

4.1.6.2 Coverage for claims by employees under the U. S. Longshoremen's and Harbor Worker's Compensation Act, the Jones Act, or under laws, regulations or statutes applicable to maritime employees if the employees work is subject to the jurisdiction of those laws, regulations or statutes.

5 BUILDER'S RISK INSURANCE

5.1 Contractor will purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a replacement cost basis without optional deductibles in the amount of the Validated Target Cost. The property insurance must be maintained until Final Payment has been made or until no person or entity other than the Owner has an insurable interest in the property required to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, subcontractors and sub-subcontractors in the Project, all of whom must be included as additional insureds under the builder's risk policy.

5.2 The Builder's Risk insurance must be on an "all-risk" or equivalent policy form and include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements. and must cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of an insured loss.

5.3 Deductibles under the Builder's Risk policy, if any, will be paid by Contractor and are reimbursable as an Allowable Cost without Fee and count against the Validated Target Cost.

6 ANCILLARY INSURANCE

Ancillary exposures that may require additional insurance for the Work include the following:

6.1 Aircraft Liability.

If aircraft are used in the performance of the Work, the Contractor will maintain aircraft liability coverage including owned and non-owned, in the minimum amount of $_____. Such insurance will include the following:

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6.1.1 Additional insured endorsement for Owner;

6.1.2 Specific waiver of subrogation;

6.1.3 Contractual liability;

6.1.4 If aircraft is not owned by the Contractor, the Contractor shall cause the aircraft owner and/or operator to provide the minimum coverages and limits as stated above.

6.2 Watercraft Liability.

If watercraft are used in the performance of the Work, the Contractor will maintain watercraft liability coverage including owned and non-owned, in the minimum amount of $_____. Such insurance will include the following:

6.2.1 Additional insured endorsement for Owner;

6.2.2 Specific waiver of subrogation;

6.2.3 Contractual liability.

6.3 Railroad Protective Liability.

The Contractor will purchase and maintain a railroad protective liability policy if the Work is on or within 50 feet of a railroad or affects any railroad property including but not limited to tracks, bridges, tunnels, and switches. If such coverage is required and commercially available with the described terms and conditions.

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General Conditions of the Integrated Project Delivery Agreement

1 TERMS

1.1 Defined Terms.

Capitalized terms used in the General Conditions are either defined in the Integrated Project Delivery Agreement, this General Conditions or Exhibit A to the Agreement.

2 PROJECT ADMINISTRATION

2.1 Progress Monitoring.

The PMT is responsible for developing and updating the Cost Management Strategy, PMT Workflow Plan, BIM Workflow Plan, and the Project Schedule. These Management tools will be used to track the status of the Project against achievement of the Project Objective. If it appears that the Project Objective is not being met, the PMT will develop a recovery plan to enable the Project to achieve the Project Objective.

2.2 Project Manual.

The PMT will develop a Project Manual that documents the quality assurance plan, safety plan, work hours and work restrictions, communication protocols, specifications, Project terminology, forms and similar administrative and procedural requirements. The Project Manual will incorporate information obtained from the Joint Site Investigation. In addition, the PMT, with the assistance of the PIT as required, will meet in a BIM workshop to discuss the technical and procedural issues required in Section 2.4. The decisions reached and protocols developed will be documented in the Project Manual.

2.3 Target Value Design.

The PMT will develop protocols for using Target Value Design to develop a project that can be constructed within the VTC. The Target Value Design process will emphasize providing guidance to the Architect and its consultants regarding the relative value of different design options before they are designed, as well as the cost implications of design decisions as they are being made. The PMT will determine which specialty contractors and consultants will be responsible for developing and optimizing specific systems and sub-systems and making recommendations regarding those systems to the PMT.

2.4 Requests for Information.

2.4.1 Informal Resolution.

To the greatest extent possible, Requests for Information should be resolved directly between the requesting party and the responder. If the response results in a change or modification to the Contract Documents, it should be documented in writing.

2.4.2 Electronic Submission and Archiving.

The PMT will establish a centralized system to track information requests and responses that are available to all Project participants. Information requests and responses will be sent electronically and archived in the centralized system.

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2.4.3 RFI Scheduling.

RFIs must indicate what specific information is required and when the response must be received to avoid delaying the Work. Upon receiving an RFI, the responder must provide an immediate response either indicating the date when the response will be issued, or requesting further information necessary before it can respond. If the requesting party and responder cannot resolve differences between when the information is needed and when it can be provided, they will submit the issue to the PMT for resolution.

2.5 Submittals and Shop Drawings.

2.5.1 Submittals.

Submittals include Shop Drawings, Product Data and Samples, but are not Contract Documents. To the extent required by the Contract Documents, Submittals demonstrate how the Contractor and subcontractors propose to execute the Work shown by the Contract Documents.

2.5.1.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a subcontractor, tier subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

2.5.1.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

2.5.1.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

2.5.2 Electronic Submission and Archiving.

The PMT will establish a centralized system to track Submittals and submittal reviews that are available to all Project participants. Whenever possible, Submittals will be submitted electronically and archived on the centralized system.

2.5.3 Submittal Scheduling.

Contractor will provide a schedule that indicates when Submittals will be issued and when approval must be received to avoid delaying the Work. Disputes regarding the Submittal schedule will be referred to the PMT for resolution.

2.5.4 Architect's Review.

The Architect will review the Contractor's Submittals for conformance with the Contract Documents and approve or take other appropriate action. Approval of a Submittal does not relieve the Contractor from any of its obligations under the Agreement or of any construction means, methods, techniques, sequences or procedures unless otherwise specifically stated by the Architect. The Architect's approval of a specific item is not approval of an assembly of which the item is a component.

2.6 Inspection and Certificate of Substantial Completion.

When the Contractor believes that the Project has achieved Substantial Completion, it will notify the PMT which will review the entire Project. If the Project has achieved Substantial Completion, the PMT will issue a Notice of Substantial Completion and provide the Contractor with a list of items that must be completed, repaired, or replaced before Final Completion (Punch List). If the Project has not

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achieved Substantial Completion, the PMT will provide the Contractor with a punch list that must be completed, repaired, or replaced before Substantial Completion and the Contractor after completing those items, will notify the PMT that the Project is ready to be re-inspected. Unless otherwise agreed, the Certificate of Substantial Completion establishes the date when responsibility for security, maintenance, heat, utilities, damage to the construction work and insurance transfers from Contractor to Owner.

2.7 Final Inspection and Punch List.

Prior to Final Completion, the PMT will review the entire Project and prepare a list of items that need to be completed, repaired, or replaced (Final Punch List). Correction of all Final Punch List items to the PMT's satisfaction is a condition precedent to Final Completion of the Project.

3 JOINT SITE INVESTIGATION

3.1 Access to Existing Documents.

At its expense, Owner will provide the PMT with access to all documents Owner possesses related to the condition of the Project site that are requested and reasonably required by the PMT. This information includes:

3.1.1 Information describing the physical characteristics of the site, including surveys, site evaluations, legal descriptions, data or drawings depicting existing conditions, subsurface conditions (geotechnical engineering survey and report) and environmental studies, reports and investigations;

3.1.2 Tests, inspections and other reports dealing with environmental matters, Hazardous Materials and other existing conditions, including structural, mechanical and chemical tests, required by the PMT or by law; and

3.1.3 Any other information or services reasonably requested in writing by the PMT that are relevant to the planning, design and construction of the Project.

3.2 Joint Site Investigation.

During the Conceptualization Phase, the PMT will conduct investigations at or concerning the Project site ("Joint Site Investigation"). The Owner will make the Project site available for the Joint Site Investigation and will provide information in its possession that is required by this Section or otherwise requested by the PMT. During the Joint Site Investigation, the PMT will:

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3.2.1 Document all information that is needed from the PMT and the PIT to design the Project.

3.2.2 Verify existing conditions within the Project site, including all points of connection, and verify the accuracy of existing "As-Built" documents, as provided by the Owner through field investigations with proper due diligence to eliminate major unforeseen conditions that will result in a Change Order. If “As-Built” documents are insufficient, inaccurate or incomplete, the PMT will recommend a surveying program to provide required information.

3.2.3 Notify the Owner of the need to view inaccessible spaces (i.e. spaces containing Hazardous Materials, hard lid ceilings, buried utilities, occupied spaces, etc.) to allow the Owner an opportunity for field verification.

3.2.4 Review any existing information and determine to what extent additional investigations should be pursued and identify, in writing, any apparent deficiencies or discrepancies in the information provided by the Owner during each Phase.

3.2.5 Describe additional investigations or information reasonably required to prepare the Construction Documents, including recommending surveys, subsoil investigations, analyses, tests and reports relative to the Project site.

3.2.6 Evaluate the need for air balance reports, electrical load tests, gas and utility reports to verify the condition and capacity of existing systems.

3.2.7 Upon completion of the Joint Site Investigation, reasonably recommend that the Owner may proceed.

3.2.8 Recommend additional surveying or testing necessary to effectively design or construct the Project.

3.3 Reliance on Information.

Provided that a Party has diligently participated in the Joint Site Investigation:
(i) it may rely upon the completeness and accuracy of the information provided by the Owner, to the extent it is not contradicted by the Joint Site Investigation; and
(ii) any conditions that are later discovered to differ from the provided information, as amended and augmented by the information developed during the Joint Site Investigation, are deemed Unforeseen and Differing Site Conditions under the Agreement.

4 BUILDING INFORMATION MODEL

4.1 Software.

The Project will be designed and implemented using _____ Building Information Models and the subsidiary models as are necessary for design, fabrication and construction. All subsidiary modeling software must be interoperable with _____ or support robust

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data exchange with the _____ model(s). Clash detection will use _____.

4.2 Model Administrator.

Each Party is responsible for maintaining any individual design or analysis models and providing their modeling information, at appropriate intervals, to the administrator of the Model (Model Administrator). During Process Design, the PMT will select a Model Administrator who is responsible for receiving modeling information from the Project Information Team and incorporating the information into a master Building Information Model. Unless otherwise agreed, the Model Administrator will host and manage the modeling information.

4.3 Modeling Goals.

To the greatest extent practical, all Project information will be developed and maintained through the use of the Building Information Models. The design will be developed in the Model, constructability and cost information will be incorporated through the Model, conflict resolution will occur through the Model, Shop Drawings will be submitted and reviewed through the Model, and the Model will be kept current to reflect as constructed conditions.

4.4 Building Information Modeling Workshop.

The Project Implementation Team will meet during the Conceptualization Phase to develop detailed protocols for the use of Building Information Modeling on this Project, which will be documented in the BIM Workflow Plan. Among other things, the protocols developed will:

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4.4.1 Specify where and how the Model will be maintained including the Parties with substantive responsibility for controlling the information within specific models or model elements.

4.4.2 Specify protocols for version control, roll-back, gate keeping, and archiving. appropriate allowances for differing construction tolerances.

4.4.3 Specify the level of detail that will be modeled and incorporate

4.4.4 Specify when and how information regarding constructability and cost will be derived from the models and provided to the designers to inform design.

4.4.5 Specify when and how existing site information is incorporated into the Model.

4.4.6 Specify how RFIs, clarifications, Shop Drawing and Submittal information will be reviewed and incorporated into the Model.

4.4.7 Specify when and how conflict resolution sessions will occur.

4.4.8 Determine what information is more efficiently developed and conveyed using traditional 2D design tools and develop protocols for assuring consistency between the BIM and ancillary 2D information.

4.4.9 Specify how the BIM will be updated and function as a Record Model; and

4.4.10 Specify what design information, if any, must be developed or maintained outside of the BIM.

4.4.11 The BIM workshop will be scheduled by the Project Facilitator at the commencement of the Conceptualization Phase. Any disagreement regarding protocols, will be decided by the PMT. The Project Facilitator will document the decisions reached and the BIM protocols will be incorporated into the Project Manual as the BIM Protocol Exhibit.

4.5 Ownership of the Building Information Model.

4.5.1 Ownership.

The master Building Information Model, the subsidiary models necessary for design and construction of the Project, and any related two dimensional drawings, calculations, schedules or specifications created for the Project will, upon completion of the Project, become the property of the Owner and the Parties agree to provide the Owner, as a deliverable before Final Completion, the most recent version of all Building Information Modeling files. Notwithstanding the above, design elements that were created by the PMT or PIT members, before execution of the Agreement, as extensions to commercially available building information modeling software will remain the property of the respective PIT or PMT member that created the extension, regardless of whether it was used in a Building Information Model for this Project.

4.5.2 Licensing.

The Parties grant a non-exclusive, limited license to each other, to use any BIM information solely for the purpose of designing, analyzing, or constructing this Project. Owner grants the Parties with a non-exclusive, perpetual license solely for use, or display of, the Project BIM information for educational or promotional purposes.

This IPD Agreement template is based on following publications:

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4.6 Status of the Building Information Model.

Contractor will construct the Project in accordance with the BIM and other Contract Documents deemed necessary by the PMT at the conclusion of the Implementation Documents Phase, subject to any subsequent modifications. Elements necessary for a fully functional Project, but not modeled due to their size or level or detail, will be provided by the Contractor as part of its construction work without any change to the VTC and with a level of quality consistent with the Project and the Implementation Documents. It is anticipated that some design information, such as construction details, will not be incorporated into the BIM, but will be provided to the Contractor as conventional 2D or CAD files. Some design information will only be contained in the written specifications. The BIM, the 2D drawings, and the written specifications are all Contract Documents, which are complementary, and what is required by one is required in all.

4.7 Conflicts Between Documents.

If a conflict arises between the BIM, the 2D drawings, and/or the written specifications, the Contractor will notify the PMT of the conflict and the PMT will decide which requirement is most consistent with the Project Objective.

4.8 Submission of Signed and Stamped Drawings.

In order to obtain necessary permits and to comply with professional registration statutes, 2D drawings, calculations and specifications must be generated, reviewed, sealed and submitted to reviewing agencies and authorities. The Architect and the design/build subcontractors will each be responsible for, and will sign and stamp, the drawings, specifications and calculations prepared by them. To the greatest extent possible, the 2D drawings will be generated from the Model, and after incorporation of any agency review comments and requirements, the Model will control the construction of the Project.

5 OWNER'S SEPARATE CONSULTANTS AND CONTRACTORS

Owner may retain separate consultants and contractors to perform work and services that are related to Work being performed under the Agreement. The Owner is responsible for the timeliness and quality of the work and services of its separate consultants and contractors. The Contractor and Architect will coordinate their Work with the work and services of the separate consultants and contractors and will accommodate the work and services of the separate consultants and contractors to effect smooth and efficient workflow. Contractor will include Owner's separate consultants and contractors in scheduling, conflict resolution, and site safety programs. However, the Contractor will not be the "controlling employer" as defined by Cal/OSHA for work performed by Owner's separate contractor or responsible for separate contractor's compliance with the safety program.

6 INSPECTIONS

6.1 Notice and Preparation for Inspections.

When work is ready for inspection, the Contractor will notify the Architect and the PMT. The PMT will arrange for the required inspections. Contractor will provide any labor necessary to make the construction work ready for inspection, including labor necessary to cover and uncover any construction work.

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6.2 Cost of Inspections.

The Owner will pay for inspection of construction work completed by the Contractor and for reinspection of that work. However, if reinspection is caused by the negligence of the Contractor or because the work was not ready for inspection, then the cost of reinspection will be treated as an Allowable Cost included in the VTC.

7 NON-CONFORMING WORK

7.1 Rejection of Work.

The PMT will reject construction work that is not in conformance with the Contract Documents.

7.2 Cost of Correction.

Non-conforming construction work must be promptly corrected, repaired, or replaced. Correction of non-conforming work that was performed or installed by a Fixed Price subcontractor will be remedied at the Fixed Price subcontractor's own expense. If not promptly corrected, repaired or replaced, the Owner or Contractor may correct the non-conforming work and backcharge the Fixed Price subcontractor. Correction of non- conforming work that was performed or installed by a Cost Reimbursable Subcontractor is an Allowable Cost in the VTC.

8 SAFETY PRECAUTIONS AND PROGRAMS

8.1 Responsibility.

The Contractor is responsible for initiating, maintaining and supervising all safety precautions and programs in connection with performance of the construction work. This requirement applies continuously and is not limited to normal working hours. The Contractor must take reasonable precautions for safety of, and will provide reasonable protection to prevent damage, injury or loss to:

8.1.1 Personnel performing construction work and other persons who may be affected by the construction work;

8.1.2 Materials and equipment to be incorporated into the Project, whether stored on-site or off-site and whether or not under the care, custody or control of the Contractor or its subcontractors or tier-subcontractors; and/or

8.1.3 Other property at or adjacent to the site, such as structures and utilities not designated for removal, relocation or replacement in the course of construction.

8.2 Safety Program and Safety Manager.

Contractor will develop a written Safety Program applicable to this Project site and will designate a senior employee as the Site Safety Manager. The Site Safety Manager will be responsible for conducting regular Site Safety meetings for all persons located at the Project site and for monitoring compliance with the Safety Program.

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8.3 Safety Notices.

The Contractor will give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss. The Contractor will maintain on-site all Material Safety Data Sheets for material or products brought to the Project site.

8.4 Barriers & Warnings.

The Contractor will erect and maintain, as required by existing conditions and performance of the construction work, all necessary barricades and signage for safety and protection and will notify owners and users of adjacent sites and utilities.

8.5 Emergencies.

In an emergency affecting safety of persons or property, the Contractor must act, at Contractor's discretion, to prevent or mitigate threatened damage, injury or loss. Additional compensation or extension of Contract Time claimed by Contractor on account of an emergency will be determined by the PMT.

8.6 Accidents.

The Contractor must promptly report in writing to the PMT all accidents arising out of, or in connection with, the construction work that result in death, personal injury or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries or serious property damages are caused, the accident must be reported immediately by telephone or messenger to the PMT members and to all applicable governmental agencies.

8.7 Fines & Penalties.

The Contractor is responsible for the payment of all fines levied against it or against Owner arising from or related to violation of safety rules, regulations or statutes except for safety violations arising from Owner's separate Contractor's work. These fines and penalties are not Allowable Costs under the Agreement.

9 PROTECTION OF UTILITIES AND ADJACENT PROPERTIES

9.1 Site Utilities.

The Contractor will contact a site utility location service before excavating at the Project site and will not undertake any site activities that could damage utilities until they have been located and marked.

9.2 Adjacent Properties.

The Contractor will give 48 hours written notice before breaking ground, to all persons having interests on or near the site, including utility companies, adjacent property owners, superintendents, inspectors, or those otherwise in charge of property, streets, water pipes, gas pipes, sewer pipes, telephone cables, electric cables, railroads or otherwise who may be affected by Contractor's operation, so they may remove any obstruction that they are responsible for and have a representative on-site to see that their property is properly protected.

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10 PERMITS AND FEES

10.1 Contractor will secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the construction work. Permits and fees are Allowable Costs.

11 HAZARDOUS MATERIALS

11.1 Defined.

Hazardous Materials means any and all pollutants, wastes, flammables, explosives, radioactive materials, hazardous or toxic materials, hazardous or toxic wastes, hazardous or toxic substance or contaminant and all other materials governed by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Resources Conservation and Recovery Act (RCRA), or other applicable federal, state or local law or regulation or any substance or material which has been determined or during the time of performance of the Work is determined to be capable of posing a risk of injury to health, safety, property or the environment by any federal, state or local governmental authority.

11.2 Pre-existing Conditions.

Owner is responsible for all Hazardous Materials existing at the site prior to inception of the Project and will indemnify and hold harmless Architect and Contractor from any claims, damages and liability arising from the pre-existing Hazardous Materials. Notwithstanding the above, Contractor will defend, indemnify and hold harmless Owner and Architect from any claims, demands and liability arising from Contractor's negligent handling, transporting, treating or disturbing of pre-existing Hazardous Materials.

11.3 Introduction of Hazardous Materials.

Unless specifically required by the Contract Documents, Contractor may neither use or introduce to the Project Site, nor incorporate into the Project any Hazardous Materials. If Hazardous Materials are specifically required by the Contract Documents, the Contractor will take all necessary precautions to protect workers and the public from deleterious exposure to the Hazardous Materials and will properly and lawfully dispose of any residual Hazardous Materials.

11.4 Reporting of Hazardous Materials Release.

If Hazardous Materials are released at or from the Project site, the Contractor will immediately notify all governmental agencies having jurisdiction over the release and the PMT.

12 CLEANING UP AND RECYCLING

12.1 Material Recycling.

The Contractor will endeavor to reduce the amount of waste material generated during construction. Construction waste that is unavoidably generated will be segregated into recyclable and non-recyclable materials. Recyclable materials will preferably be reused during construction of the Project, but if Project reuse is not practical, will be recycled rather than being transported to a landfill.

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12.2 Cleaning Up.

The Contractor will keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Agreement. At completion of the construction work, the Contractor is responsible for removing waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project. If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost associated with the clean-up will be charged to the Contractor.

13 SUSTAINABILITY

[insert any sustainability requirements and/or LEED certification goals.]

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AIA® Document C191™ – 2009 Exhibit D

Target Criteria Amendment, Exhibit DD: Integrated Scope of Services

This Exhibit is incorporated into the accompanying Agreement dated the day of in the year
(In words, indicate day, month and year)

for the following PROJECT: *(Name and location or address)*

(Complete the matrix by entering information in the spaces below. Adapt the matrix to the needs of the Project by augmenting, deleting or modifying the listed Task Descriptions as necessary. Enter explanatory notes by number only and place the numbered notes on the last page of the matrix where indicated.)

LEGEND

P Perform the indicated task

C Party responsible for coordinating and integrating completeness of task assigned to a Non-Party

A Non-Party responsible for providing assistance in performing the task to the extent of the Non-Party's knowledge, skill and experience

Task Description	Parties									Non-Parties									Task Not Required	Notes *(Enter #)*
	Owner	Architect	Contractor																	
§ 1.0 CONCEPTUALIZATION PHASE																				
§ 1.1 Project Administration Services																				
.1 Provide overall facilitation, coordination, organization and direction of Project Management Team members and advisors																				
.2 Confirm Project Management Team evaluation of Owner Criteria																				
.3 Monitor completeness of Project information																				
.4 Determine standards for BIM and digital coordination																				
.5 Coordinate, integrate and synchronize all Models and other digital information																				
.6 Provide discipline coordination																				
.7 Coordinate information and data provided to and developed by Project Management Team																				
.8 Determine required data																				
.9 Agency consultation/review/approval																				
.10 Provide schedule development and monitoring																				
.11 Provide required submissions and presentations																				
.12 Provide tests, inspections and reports required by law or as otherwise agreed to by the Project Management Team																				
.13 Provide required legal, insurance and accounting services																				
.14 Identify and assign responsibility for other Project Administration services: *(Describe)*																				
.1																				
.2																				
.3																				
§ 1.2 Data Gathering Services																				
.1 Prepare Draft Data Gathering Report																				
.2 Review and comment upon Draft Data Gathering Report																				
.3 Prepare Final Data Gathering Report																				