

TEAMS MATTER: LESSONS FROM ARRA

GSA REGION 5 AND THE AMERICAN RECOVERY AND REINVESTMENT ACT

RENEE CHENG, AIA, PROFESSOR, SCHOOL OF ARCHITECTURE UNIVERSITY OF MINNESOTA

PUBLISHED MAY 2016, SPONSORED BY GSA REGION 5 AND 4240 ARCHITECTURE

CONTEXT

Professor Renée Cheng and Research Fellow Katy Dale of University of Minnesota School of Architecture were contracted to study eleven American Recovery and Reinvestment Act (ARRA) funded projects in the Great Lakes Region (Region 5). The General Services Administration (GSA) leaders identified five of these projects for in-depth study. ARRA provided a common context to achieve **the purpose of this study: to discover factors of project practices that most positively or negatively affect team collaboration and performance.**

In 2009 the ARRA was enacted in response to the severe economic downturn.

ARRA established three national goals:

1. Create new jobs and save existing ones
2. Spur economic activity and invest in long-term growth
3. Foster unprecedented levels of accountability and transparency in government spending

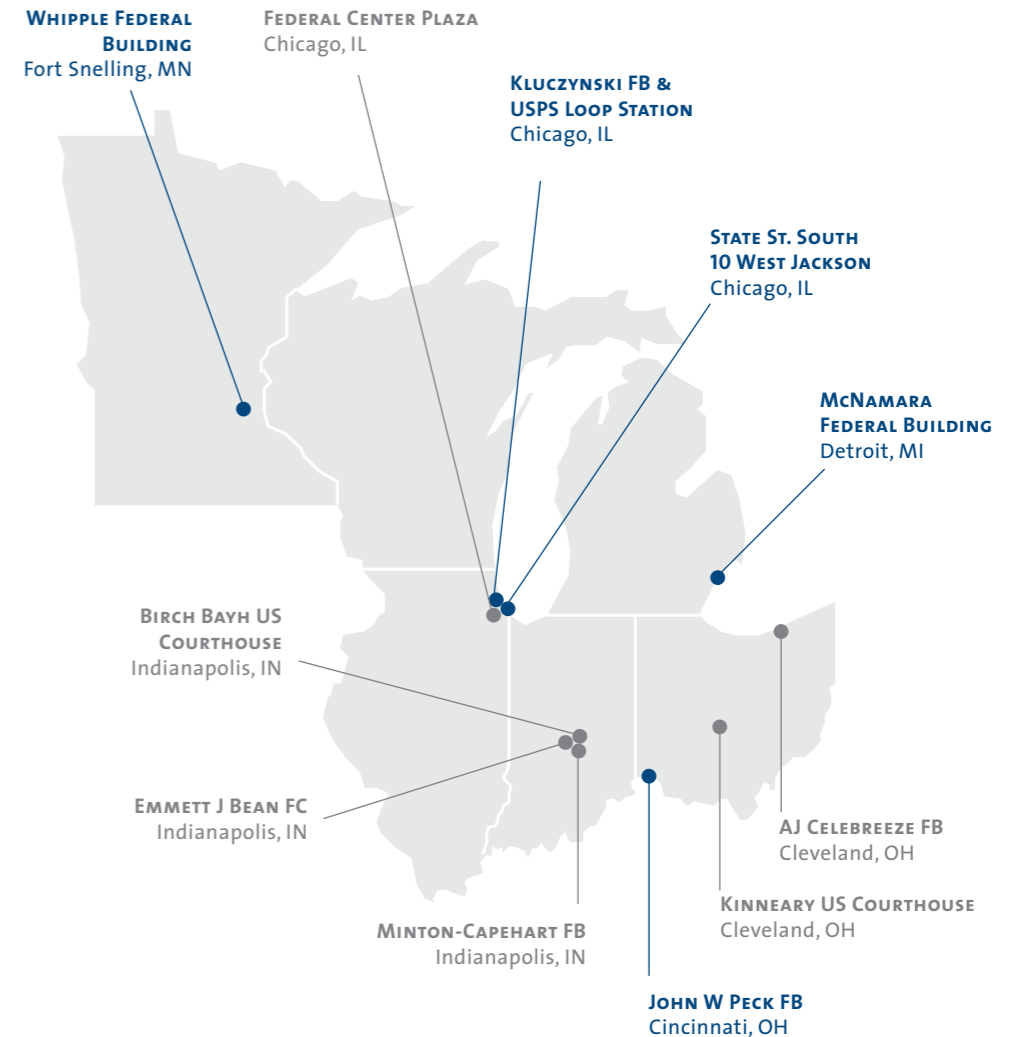
And a fourth goal specific to the GSA:

4. Raise standards of energy efficiency and promote high performance buildings

The estimated total investment of the Recovery Act was \$840 billion. The GSA received \$5.546 billion, of which \$4.5 billion was allocated to converting existing GSA buildings into high-performance green buildings, as defined in section 401 of Public Law 110–140. This conversion would modernize the nation’s infrastructure, reduce the federal government’s consumption of energy and water, and increase the use of clean and renewable sources of energy.¹

GSA Great Lakes Region funded a total of eleven major federal modernization projects using ARRA funding, at locations indicated on the report map. The simultaneous start of multiple large-scale projects, operating with shared ARRA goals, provided a unique opportunity to compare and contrast projects. The goal of this study was to identify factors that had strong positive or negative effects on the collaborative culture of the project teams. The comparison of design and construction projects is inherently complicated by circumstances unique to each project. Given the potentially endless number of factors that can impact project delivery, this report focuses on selected team-performance outcomes and highlights the presence or absence of “ingredients” that influenced those outcomes.

The information reported here represents a snapshot of each project and is not intended to be a complete project review, performance review of individuals, or an assessment of the ARRA program. Information collected and reported represents a range of team-member perceptions. For the five projects studied in depth, core team members were interviewed during the summer of 2012. A questionnaire was sent in December



MAP OF GSA REGION 5 ARRA PROJECTS

● PROJECTS STUDIED IN-DEPTH

2012 to a wide range of project participants from all eleven teams. The interviews and questionnaires were intentionally timed to occur during an active period of project delivery in order to capture the most candid attitudes and perceptions, avoiding the positive bias that can occur after a project is completed. Variation in the project phase at the time of interviews and questionnaires created some imbalance in the results, as some teams were closer to finishing their project than others.. Interviews and questionnaires were not intended to capture the entire project-delivery process, only a snapshot at different points in time. The **timelines** in the Case Study section of the report graphically indicate the stage of each project when the information was gathered.

1. GSA. (Last Reviewed January 8, 2013). American Recovery and Reinvestment Act. U.S. General Service Administration. Retrieved April 24, 2013. From <http://www.gsa.gov/portal/category/25882>

SUMMARY

All projects demonstrated a significant level of goodwill, competence, and a desire to deliver a high-quality building. However, the degree of success of team outcomes varied. The degree of success is strongly tied to several factors that can inform future GSA-wide processes.

ARRA projects shared a high level of complexity and risk in the following categories: cost, budget, schedule, technical design, logistics, and transactions. All projects involved renovation, and interfacing with existing building systems raised technical (and often unforeseeable) challenges. In some cases, technical complexity was increased by the integration of innovative high-performance building technologies with outdated systems. Logistics were complicated as tenants typically remained in their units during the renovation, introducing security and operational concerns.

The ARRA goal to inject much-needed capital into the economy led to fast tracking the design and emphasis on spending funds expeditiously. Both of these aspects required higher-than-usual levels of GSA oversight and reporting by teams. Typically, GSA projects involve many project stakeholders. While this provides oversight to ensure the effective use of taxpayer dollars, each layer of procedure and personnel increases transactional risk. With the availability of ARRA funding, the volume of projects was decidedly larger than the typical GSA workload, which stretched their resources and compressed the available time for decision making.

Although the baseline level of complexity for all ARRA projects is relatively high, there were variations in the nature and scope of projects. Our survey data indicate that lower-risk projects required fewer resources and could rely primarily on logistical and process tactics to achieve success. Higher-risk projects required multiple types of tactics and strategies to work in concert—for example, leadership and commercial strategies, logistical and process tactics, and high levels of team collaboration and performance. In general, we found the most successful team-performance outcomes were achieved when leaders “managed globally” by fully internalizing ARRA goals and embracing the challenges inherent to them. Those leaders who relied on typical project-management methods were slow to understand the unique nature of ARRA requirements. The complicated and dynamic nature of the ARRA placed project teams in situations where varying degrees of resilience were revealed. In the cases where leaders underestimated the demands of the ARRA, project teams were rarely clear on goals and had difficulty navigating the GSA’s needs and changing objectives. In teams where project leaders acknowledged the ARRA’s complexity, changing demands were well communicated and teams adapted and realigned as the project evolved. While the exact situation presented by the ARRA is unlikely to occur again, these cases allow us to precisely define key ingredients that most actively contribute to success in a complex and challenging environment.

In addition to lessons learned from studying the eleven projects in aggregate, there are specific examples of effective strategies and tactics from individual projects we believe can improve typical GSA projects. The report offers insights gained from each project; two particularly valuable projects are highlighted below:

Whipple, a high-risk and highly complex project, succeeded through strong leadership built on a pre-established team. Pre-established teams offer many advantages that should be considered a requirement for high-risk projects.

This project modeled the following strategies and tactics, which we recommend for all GSA projects. Some of these strategies are already identified as GSA best practices but may need evaluation in terms of their implementation.

- Select/train project leaders for ability to manage globally – seeing beyond the day-to-day challenges of a project.
- Implement monthly executive meetings to review global project operations, such as communication effectiveness and timeliness of decisions.
- Frequently reiterate of GSA and project goals at all meetings and effectively communicate goals to all project participants.
- Designate one person to be responsible for each critical area or stakeholder group, which requires sufficient staff to support specialization.
- Dedicate time for a facility manager to collaborate with core project team.
- Involve subcontractors in design and base their qualifications on criteria measuring performance factors, such as reliability and communication.
- Use commercial software for communication and information sharing—GSA ePM (electronic project management) software creates additional administration work for the purpose of documentation. Commercial project-management software is more familiar to practitioners and better matches the required pace of project communication.

State Street, a moderate-to-high-risk and highly complex project, succeeded through strong leadership and strategic use of co-location. Reduced risk by tenant vacancy offers advantages that should be considered for projects with high technical complexity.

This project modeled the following strategies and tactics, which we recommend for all GSA projects:

- Reduce GSA review time by increasing the required number of submittal copies (more copies eliminates the need for GSA to make reproductions) and implementing “submittal parties,” where real-time face-to-face reviews take place between interdisciplinary participants.
 - Strictly implement “right people” strategies by clearly defining roles and decision-making pathways for a core group and a global group.
-

RECOMMENDATIONS

RISK: DETERMINATION AND MANAGEMENT

We recommend that the GSA develop an assessment tool to evaluate the risk profile of each project with input from team members prior to the commencement of a project. This tool should address the following areas of risk:

- Number of stakeholders. A GSA baseline should be set, and projects with higher-than-average number or unusual distribution of stakeholders should be considered a high transactional risk.
- Discontinuity of effort. Breaks in time between any phase, from design through construction, create risk. Anticipated personnel changes should be assessed early; unplanned changes should trigger review.
- Team members or firms new to GSA processes. The necessary level of mentorship should be measured for those firms new to the GSA. Some firms may have internal resources upon which to draw; other may need more formal mentoring.
- Remote project location. If a project requires multiple team members to travel to the site, the robustness of the communication plan should be measured.
- High levels of complexity. A baseline should be set, and projects with higher-than-average complexity factors should be considered high risk.

Often risks cannot be eliminated, but they can be mitigated. Following are some of the most important strategies to manage risk:

Team collaboration – Particular attention should be given to the following leadership strategies, which build alignment, trust, and respect early.

1. Manage globally – Collaboratively plan processes and frequently review communication and operational protocols. Leaders caught up in day-to-day technical issues are less able to identify risk and adapt accordingly.
2. Early planning for complexity – Identify and acknowledge potential challenges by engaging CMC or CMA to provide additional knowledge to review for potential risk.
3. Clear objectives – The GSA must set clear goals so the team is aware of decision-making criteria and can align their tactics, such as review processes or issue-resolution protocols, to achieve goals.
4. Transparent communication – Leaders should cite clear reasons behind changes or requests related to GSA goals to help build trust.
5. Clear roles – Identify core team and global team with lines of decision making.
6. Performance tracking – Set team performance goals; use metrics and incentives. Leaders must follow through if goals are missed.
7. Responsiveness to recommendations – Peer Review recommendations should receive response and implementation on an agreed upon and timely schedule.

Quality and reliable information. Accurate information, critical to risk management, depend on multiple ingredients:

1. Microscale streamlining – of review and approval processes.
2. Meeting effectiveness
 - a. Alignment – Hold core-team meetings prior to larger team meetings to review and align key messages and goals.
 - b. Processes – Implement meeting structures and processes to manage the flow of information with effective meeting preparation and follow through.
 - c. Focused meetings – Across all projects, there were examples of focused meetings with a variety of titles: Core Team Meetings, Design Comment Open Houses, Onboard Design Reviews, “Submittal Parties,” and “Coordination Parties”.
3. Co-location – Physical co-location can build relationships and ensure those right experts are available in a timely manner.

OVERALL RECOMMENDATIONS

Some recommendations below are new, others recommend improved implementation of existing GSA practices.

New processes

1. Early risk assessment by a collaborative, interdisciplinary team using a standard GSA risk-assessment tool (to be developed).
2. Integration of design and construction teams early in the project delivery.
3. Streamlining of GSA internal-communication processes, including reducing steps in the review processes through “submittal parties” and other tactics that ensure timely interdisciplinary feedback.
4. Co-location of key players, while remaining aware that overreliance on co-location or excessive frequency of meetings can reduce efficiency. When co-location cannot be achieved, consider dedicating time and activities early on that provide face-to-face team-building opportunities and extra attention to communication and decision-making-process planning and implementation.

Implementation of existing processes

5. Timely follow up of risks identified in Peer Reviews and other known risks.
6. Dedicated project team members located on-site tasked with communicating with building stakeholders and responsible for meeting their goals and expectations.

METHODOLOGY AND ANALYSIS

Data Collection

Framework for Study

Based on experience and past research in Integrated Project Delivery, we set up a framework, see *Case Study Construct* diagram, that identified variables to be studied and evaluated; these variables shaped interview and survey questions.

Interviews

The research team visited 5 project sites and conducted a 2-hour interview with each core team, primarily representatives from the owner (GSA), agency Construction Manager (CMA or owner rep), architect, and Construction Manager as Contractor (CMc).

Documents

Documents, such as Peer Review reports, were collected from each team in the study as a source of data verification and supplemental information.

Survey

A questionnaire was developed in consultation with researchers from the Department of Construction Management in the College of Built Environments at the University of Washington. The questionnaire was distributed to all 11 ARRA projects. Of 190 questionnaires distributed, 162 questionnaires were completed, achieving a questionnaire response completion rate of 85.3%.

Analysis

Interviews and Document Data

Interviews were transcribed and text was sorted into three broad categories (context, key ingredients, and team outcomes) defined by our Case Study Construct. Survey results and further sorting of text created the detailed list of strategies, tactics and team collaboration and performance outcomes. Narratives explaining Key Ingredients and Team Outcomes were derived from the sorted transcript data, survey responses, and supplemented with some Peer Review report information.

Survey

The survey was analyzed following a Qualitative Comparative Analysis (QCA) model. QCA is a useful technique that is emerging in the social and policy sciences where the causes and outcomes in each case seem complex and interrelated. QCA is especially useful when there are only a handful of real cases to talk about, because traditional statistical techniques can only handle large datasets and allow researchers to make only correlational, rather than causal, arguments. Each of the cases in this study

comes with rich information about the dynamics of each project, and QCA allows us to tell a powerful and compelling story about likely causes for desired outcomes. For small number of projects, traditional statistical methods that rely on probability cannot be used, as these statistical studies require a larger number of cases (usually more than 200) to prove significance and achieve a high degree of confidence in the results.

In the QCA method, researchers define a case with a set of variables, (in this study, a case is one of the GSA Region 5 ARRA projects and the variables were described in the Case Study Construct). This allows us to study the variables in the context in which they occurred and across the projects where they were observed. Using cases defined by a set of variables, researchers can see when variables occur together, and can uncover what is called the “causal pathways” of the cases at hand—the “why” and “which causes” of the analysis.

In QCA analysis, the software known as fsQCA (Ragin et al. 2006) constructs lists of all theoretically possible combinations (permutations) of variables. Only some of these will have been observed from the data. For example, in this study that means the combinations of variables from each of the 11 building projects. By testing what combinations of variables occurred using Boolean logic, the fsQCA software generates which combinations of variables are sufficient causes for an outcome. In other words, the program parses the factors that are important for the outcome by comparing all the factors from all the cases and seeing the patterns and consistencies between cases.

There are two measures to consider: Consistency and Coverage. Consistency measures the extent any particular variable is a part of the outcome, or in other words, how well any particular variable fits the overall explanation. Coverage measures the proportion of case memberships in the outcome that is explained by the complete solution, or in other words, how many cases can be described with the overall explanation.

STUDY ORGANIZATION

The ultimate goal of any building project is a high quality building that meets design, energy and construction goals, is cost effective and completed on schedule. Each design and construction project is unique and delivered by a group of people; delivering a successful building is highly dependent on the culture and performance of the team. In most cases, increased performance by the team lead to increased value in the finished building. Since team performance is key, this study focuses on variables that impact the collaboration and performance levels within teams.

The overall success or failure of a project delivery process is influenced by a several variables, from individual personality types within the team to financial, construction, or relational risks. The long list of variables has infinite possible combinations. In order to observe the complex social and technical dynamics found on a project team, some simplification and elimination of variables must be done in order to uncover the key causes behind important outcomes. In a sense, our research goal is to identify the “key ingredients” in the “recipe” for success; to identify both the most useful recipe and the most important ingredients.

Based on the interviews, our prior work on Integrated Project Delivery and in collaboration with researchers from the Department of Construction Management in the College of Built Environments at the University of Washington, we developed a model that frames our study around variables universally relevant to project delivery. The model categorizes variables into three main groups: contextual, causal, (which we later combine and refer to as key ingredients), and outcome variables.

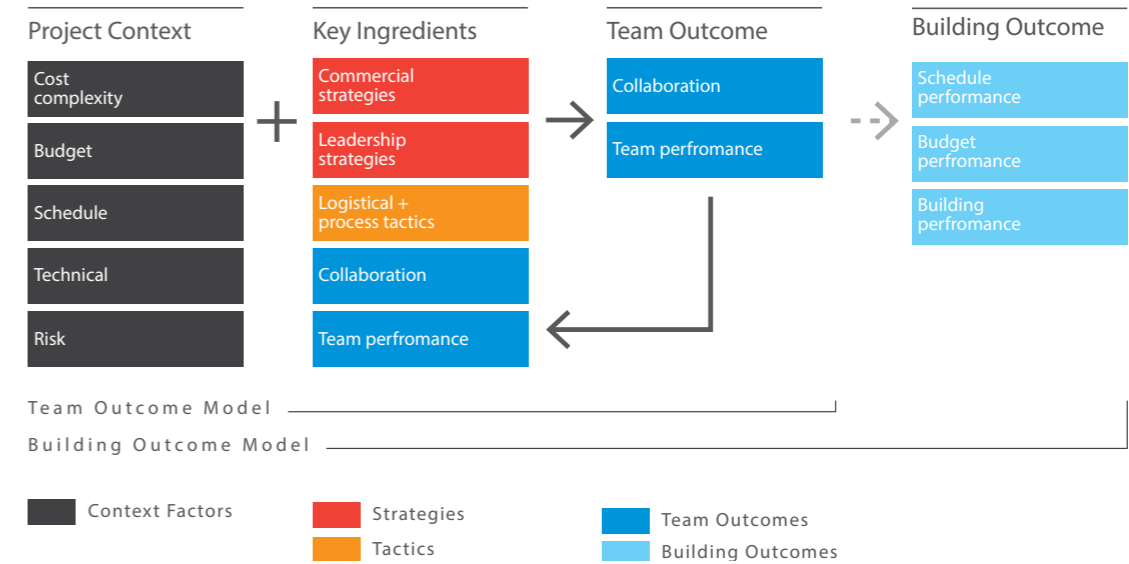
To explain the framework, we created a series of diagrams that move from broad categories to detailed specificity. This framework functioned as a guide to data collection and was refined throughout our research to map out the interrelationship of key causal variables.

The first diagram, **Case Study Construct**, describes the broad framework common to all projects: 1) Project Context, 2) Key Ingredients, 3) Team Outcome, and 4) Building Outcome.

Project Context variables describe the complexity and risks surrounding each case, looking at the levels of budget, cost, schedule, and technical complexities and risks that each project had to cope with. In other words, context variables were those given factors that influenced the project environment which were not a direct result of decisions that project participants made.

Key ingredients include commercial, leadership and process strategies. 1) Commercial strategies include variables in GSA funding process and decisions, such as the presence of shared savings in the contract. 2) The leadership strategies category evaluates demonstrated GSA leadership capability. 3) The logistical and process tactics category captured the use and level of process management strategies, such as the type and quality of team meetings or co-location.

CASE STUDY CONSTRUCT

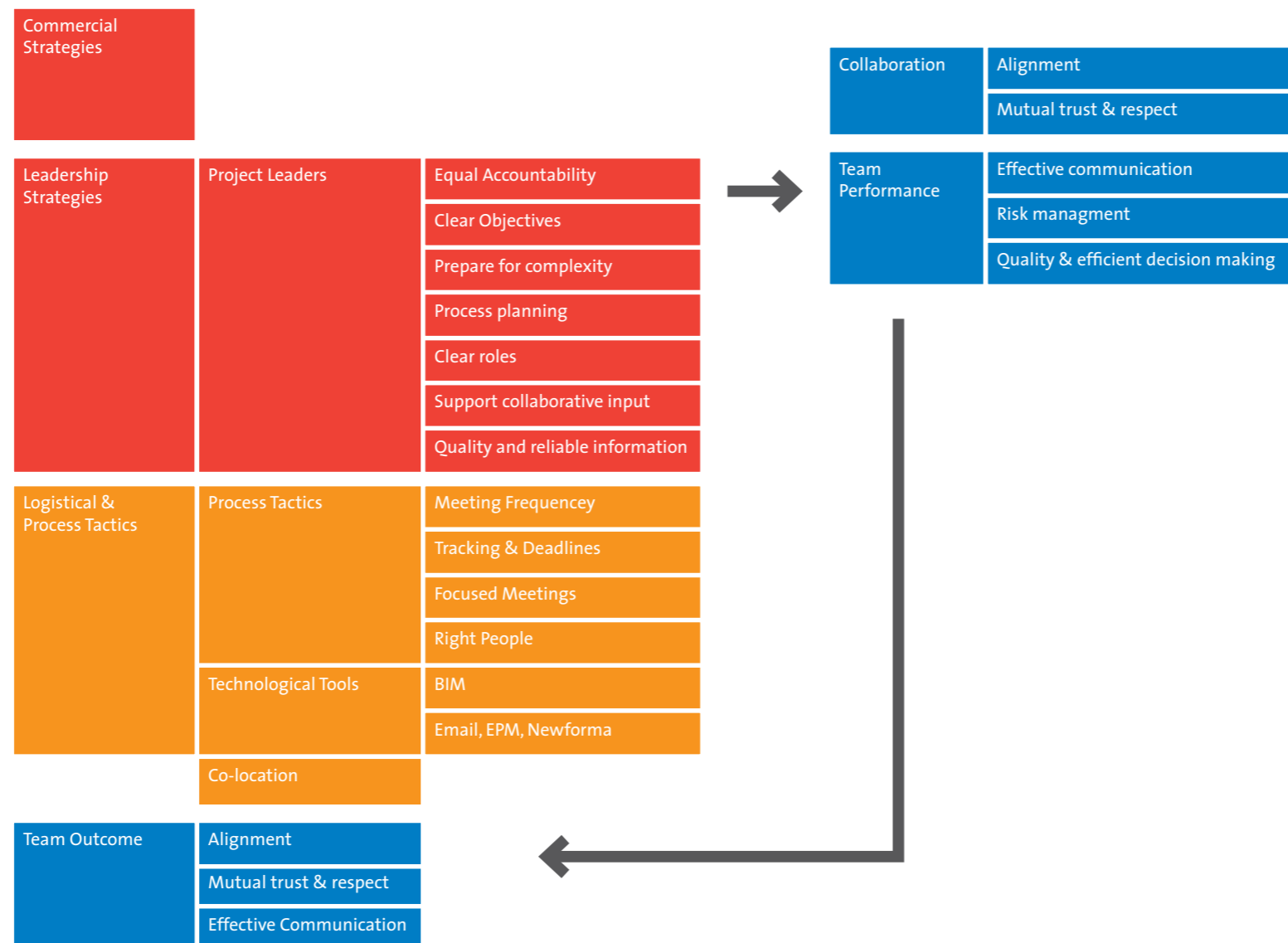


Team outcome include teamwork and relationship variables. 1) The team collaboration outcomes rely on goal alignment and mutual trust and respect within the team. 2) Team performance outcomes rely on effective communication, risk management, and the quality and efficiency of decisions.

Building outcome is based on a variety of building performance measures including: meeting project scope and sustainability goals, overcoming budget complexity, producing a high quality building and demonstrated innovation. Outcome measurement was based on team member perceptions; actual building performance outcomes were not evaluated since most ARRA projects were not yet completed at the time of our study.

High-performing teams overcome complexity and context risk and achieve positive **Building Outcomes**. Our study focuses on the variables controlled by project leaders and team members that support development of a high-performing team.

KEY INGREDIENTS AND OUTCOMES



Within the Key Ingredients and Team Outcome categories, there are sub-categories describing specific strategies, tactics, relationship characteristics, and performance metrics critical to the creation of a high-performing team, illustrated in the **Key Ingredients & Team Outcome Variables** diagram. The diagram illustrates that Team Outcomes (blue), result from ingredients but also become Key Ingredients contributing to other outcomes. For example, alignment is a team outcome that results from several key ingredients. Alignment is also a key ingredient contributing to a different team outcome: effective communication.

Although the diagram appears as a simple equation, the relationship between key ingredients (causal variables) and outcome variables is extremely complex, see *Ingredient Map*. The same outcome can be the result of different causes. For example, a significant project delay or a complex budgeting process could potentially lead to the same end result—a project that is over budget. Furthermore, causes in real life are often interrelated, but in many statistical models they are presumed to occur independently. For example, managing risks rarely tied to a single causal variable. To successfully manage risk, multiple causal variables need to be present: strategies for involving right expertise, tactics implementing the flow of quality information to inform decisions and actions. Another dimension of the complex relationship is that a single cause can lead to different and even opposite effects¹ — for example, a project set-back that ruins momentum for one team may catalyze another team to raise the level of their work.

1. Greckhamer, T., V. F. Misangyi, H. Elms and R. Lacey (2008). Using qualitative comparative analysis in strategic management research: An examination of combinations of industry, corporate, and business-unit effects. *Organizational Research Methods*. 11: 695-726.

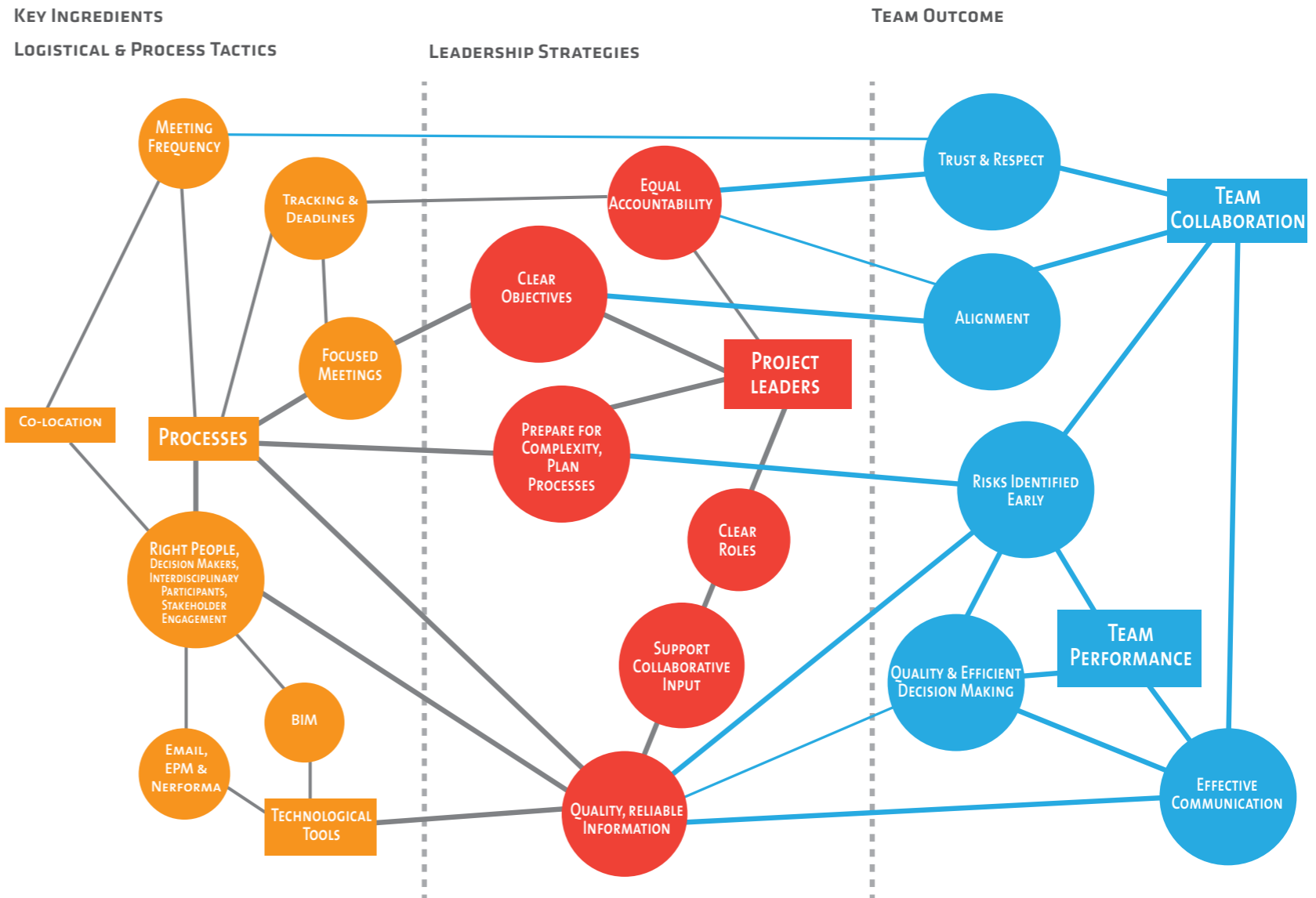
INGREDIENT RELATIONSHIP MAP

We developed a **Key Ingredient Relationship Map** to inform the format of the case study report. Within the report, we note Key Ingredients (strategies, tactics and outcomes) that contribute most to an outcome in the *footer* of outcome pages. The map illustrates the complex and sometimes reciprocal causal pathways that emerged from studying information from the 11 ARRA cases for the three significant categories: logistical and process tactics, leadership strategies and team outcomes.

Positive team outcomes were almost guaranteed when all three of the categories (tactics, strategies and outcomes) were successfully balanced; conversely, difficulties often arose when the categories were not in balance. For example, in some cases leadership failed to clarify roles of team members and stakeholders, causing confusion within the team over the right people to engage, negatively impacting the quality and efficiency of decision-making.

The example described above illustrates the central (and potentially negative) role leadership strategies play. Project leaders, whether one champion or the core team, set the tone and relational expectations for the team's collaboration levels and significantly impact the degree to which logistical and process tactics are implemented. Logistical and process tactics organize the team and leverage project resources to provide quality and reliable information, the foundation of effective communication, risk management, and efficient decision making.

KEY INGREDIENT RELATIONSHIP MAP



SURVEY RESULTS

Due to the high levels of consistency across the projects, we summarize the findings with a “kitchen-sink” model, testing the influence of all categories of variables on the building outcome.

QCA MODEL: BUILDING OUTCOME



This model tested how well building outcomes could be described by the combination of team performance, collaboration, logistics and process tactics, leadership strategies, commercial strategies, and the complexity and risk of the project.

In this analysis, there are two solutions, the Complex Solution and the Parsimonious Solution.

Complex Solution (solution coverage: 94% solution consistency: 84%)

<i>Recipe</i>	<i>Raw Coverage</i> ¹	<i>Unique Coverage</i> ²	<i>Consistency</i> ³
Better building outcomes result from high levels team performance, collaboration, leadership and commercial strategies, especially in low risk buildings.	65%	6%	84%
Better building outcomes result from high team performance, collaboration, levels of logistics and process tactics, leadership and commercial strategies.	88%	29%	94%

As you can see, there are two causal pathways in the complex model to high building performance.

1. high team performance + high collaboration + high leadership strategies + high commercial strategies + low risk = better building outcomes.
 2. high team performance + high collaboration + high logistics and process tactics + high leadership strategies + high commercial strategies = better building outcomes.
- These two causal pathways explain 94% of the cases with a high solution consistency of 84%, which is considered high for this number of cases.

Projects are well explained by Causal Pathway 1 include Birch, Celebrezze, South State St, Kinneary and Minton. Projects that are well explained by Causal Pathway 2 include Whipple, Birch, Kinneary, Minton and Bean. Note that there is an overlap between the cases that fit pathway 1 and pathway 2. This means that Birch, Kinneary and Minton fit both pathways well, while Celebrezze and South State St and Bean are more aligned with one pathway as opposed to the other.

QCA generates what is called “parsimonious solutions,” the smallest set of variables that describes the greatest number of cases. In our second model, the parsimonious solution, we find that a majority of cases be explained solely by two variables: High logistics and process tactics + low risk.

Parsimonious Solution (solution coverage: 59%, solution consistency: 100%)

<i>Recipe</i>	<i>Raw Coverage</i> ¹	<i>Unique Coverage</i> ²	<i>Consistency</i> ³
Better building outcomes result from high levels of logistical and process tools in low risk settings	59%	59%	100%

This solution means that having high use of logistics and process tactics in low risk settings is a direct way to get to high building outcomes. Using these tools well, especially in the less risky and less complex projects, results in good outcomes. This parsimonious solution explains 59% of the cases. And the solution is consistent with all 11 projects. In other words, more than half of the 11 projects fit the explanation perfectly, and all are consistent with the result.

1. Raw coverage are the percentage of cases that match this pathway exactly.

2. Unique coverage are the percentage of cases that are explained only by this pathway and not explained by the other pathways in the solution

3. Consistency measures the degree to which membership in each pathway solution is a subset of the outcome. Solution consistency measures the degree to which membership in the solution is a subset of the membership in the outcome. Both are used to ascertain how well particular pathways or whole solutions fit the outcome.

TRUTH TABLE

	Context							Key Ingredients															Outcomes														
	Project Size	Complexity and Risk	Logistical Complexity	Level of scope development at ARRA award	Frequency of scope refinement after ARRA award	Experience Level (Years in Career)	Experience Level (Familiarity)	Commercial			Leadership									Logistical & Process Tactics			Team Outcomes					Building Outcomes									
								Presence of shared savings (1=n, 2=y)	Impact of savings and funding process	Impact of GSA funding decisions	Impact of ARRA visionary goals	GSA PM Leadership Capability	GSA Leadership Impact on goal achievement	GSA Regional Leadership Involvement	Accountability	Effective and healthy relationships	Continuity	Core team supported planning for complexity	Early process planning	Processes supported joint planning and decisions	Timely Involvement of partners & stakeholders	Meeting Quality	Extend and Breath of BIM usage	Degree of Co-location	Trust and Respect	Aligned Goals	Effective Communication	Decisions Quality	Collaboration	Team Capability	BIM Impact	Design includes Innovative Technology	Contribution to advancing sustainable technology	Impact of scope refinement	Cumulative ARRA Outlay Performance	Monthly ARRA Outlay Deadline Performance	Overall Project Success
Bean	1.00	3.88	2.2	1.38	2.88	4.00	1.67	2.00	3.45	3.82	3.91	4.30	3.83	3.48	2	4.11	1.00	4.14	3.00	2.86	2.63	4.19	3.50	2.00	2.88	3.71	2.86	4.08	4.25	4.00	3.86	4.00	2.00	3.38	3.00	3.60	4.34
Whipple	5.00	4.19	3.00	1.15	3.63	4.00	2.37	2.00	3.02	3.87	4.18	4.30	3.84	3.16	1.95	3.93	2.80	4.06	2.88	2.82	2.72	3.96	3.96	5.00	2.8	3.49	2.69	3.84	4.58	4.31	3.88	5.00	1.94	3.94	5.00	4.20	4.24
Minton	2.00	3.90	2.60	3.60	3.50	2.00	1.94	1.00	-	3.69	3.68	4.34	3.85	2.50	1.94	4.29	4.00	4.29	2.86	2.86	2.49	4.13	3.2	3.00	2.71	3.70	3.00	4.05	3.92	4.43	2.42	-	2.00	3.17	2.00	3.10	4.71
Kinneary	1.00	3.76	2.60	2.50	2.89	4.00	2.55	1.86	3.42	3.33	3.58	4.24	3.70	2.89	1.89	4.17	1.00	4.13	2.89	2.89	2.66	4.24	2.57	2.00	2.78	3.67	2.67	4.11	4.17	4.28	2.40	2.00	2.00	3.89	1.00	2.80	4.27
Celebrezze	5.00	3.87	3.00	1.57	2.67	4.00	2.34	1.17	4.40	3.50	3.47	4.01	3.79	3.26	1.89	3.86	3.50	4.22	2.67	3.00	2.70	3.61	2.10	4.00	2.78	3.56	2.67	3.99	3.98	4.00	1.87	4.00	2.00	3.44	2.00	2.70	4.34
State St.	1.00	3.54	1.00	1.40	3.21	3.00	2.31	1.00	-	3.32	3.58	3.81	3.71	3.11	1.87	3.86	2.90	3.90	2.65	2.78	2.61	3.74	3.25	3.00	2.64	3.30	2.71	3.46	3.64	3.96	2.88	1.00	1.75	2.95	3.00	3.10	3.96
Birch	3.00	3.92	-	3.80	2.75	5.00	2.17	1.00	-	3.47	3.94	3.76	3.60	2.67	2.00	3.95	-	3.75	2.50	2.40	2.26	3.60	-	4.00	2.46	3.00	2.50	3.29	3.85	4.20	-	2.00	2.00	3.50	3.00	2.80	4.01
Plaza	1.00	4.45	-	1.00	2.88	1.00	2.02	1.67	3.00	3.01	3.53	3.96	3.76	3.26	1.88	3.50	-	3.33	2.43	2.29	2.29	3.79	3.00	3.00	2.55	3.07	2.00	3.66	3.81	3.14	1.92	1.00	1.71	2.00	4.00	3.50	3.42
McNamara	2.00	4.13	-	2.11	3.45	3.00	2.23	1.89	3.21	2.93	3.32	3.34	3.24	3.32	2.00	3.47	-	3.18	2.73	2.33	2.33	3.25	2.81	4.00	2.35	3.10	2.36	2.86	3.23	3.33	3.22	1.00	1.82	2.33	3.00	2.40	3.88
JCK	4.00	4.38	3.80	2.48	3.59	3.00	2.17	1.08	3.00	2.94	3.31	3.36	3.51	3.15	1.87	3.40	4.20	3.27	2.30	2.27	2.28	3.48	2.75	5.00	2.24	2.89	2.30	2.98	3.16	3.10	2.46	1.0	1.93	2.40	2.00	2.90	3.61
Peck	2.00	4.16	4.00	3.31	3.78	2.00	1.82	1.50	2.81	2.23	2.76	2.38	2.58	3.04	1.80	2.67	5.80	2.38	1.69	1.67	1.72	2.92	-	2.00	1.76	2.20	1.67	2.33	2.40	1.79	-	1.00	1.43	1.39	1.00	2.80	2.39

This diagram graphically depicts the numerical results from the questionnaire in three categories: Context, Key Ingredients, and Outcomes. Color-coding the results using gradient, positive results are indicated in a dark color, negative in light. This “truth table” was used as a tool to map patterns and trends comparing all 11 ARRA projects.

There are two patterns of note: projects high in complexity (represented by the darker grey in context section) with poor implementation (lighter pink/orange of key ingredient section) had

lower team and building outcomes (lighter blue in outcome sections). This pattern is exemplified in JCK and Peck. Highly complex projects with positive outcomes also scored positively on implementation of key ingredients (darker overall in all sections, exemplified by Whipple). By comparing these two patterns, we conclude that complex projects require strong tactics and strategies to reach positive outcomes. Lower scores in tactics and strategies can be tolerated in low complexity projects but negatively impact outcomes in complex projects.

REPORT NAVIGATION

The presentation of each case follows the framework described in the *Study Organization* section; team outcomes are presented in detail. An interactive matrix format allows review of key ingredient and outcome variables found within one project or the review of one variable across multiple projects.

Case studies under the *Case Studies* tab can be navigated with the left side menu to see cumulative results of all 11 ARRA projects (primarily based on survey data), and each of the five ARRA projects we studied in depth. The top navigation bar contains tabs within three primary categories: Overview, Key Ingredients, and Team Outcomes.

The *Overview* section primarily provides context about each project and the level of complexity and risk. The Survey Outcomes tab provides projected building outcomes based on each team’s perception assessed in the questionnaire, actual building outcomes could not be assessed because projects were not complete at the time of the study.

The *Key Ingredients* section describes the leadership strategies and logistical and process tactics implemented on each project, providing a summary picture of how the team operated.

The bulk of the report is contained in *Team Outcomes*. Narratives for each project describe the degree of success achieving desired team collaboration and performance outcomes. The footer on each outcome tab notes the *key ingredients* most frequently linked with the specific outcome; font weight indicates the varying degree of implementation in that particular project. For example, one of the key ingredients for achieving alignment is “Clear Objectives,” this phrase appears in the footer of the Alignment tab for all projects. For a team where objectives were clear, the phrase is very bold. If the team did not have clear objectives, the phrase is in lightweight font, indicating it was lacking. If a team achieved some degree of clarity of objectives (for example, objectives were clear within the core group, but not with facilities or tenants), the phrase is shown with moderate font weight, indicating partial success.

Executive Summary	OVERVIEW				KEY INGREDIENTS		TEAM OUTCOMES				
	At a Glance	Context	Insights	Survey Outcomes	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Integrity	Effective Communication	Risk Management	Quality & Efficient Decision Making
Methodology and Survey Report											
Case Studies											
Supplemental Information											
ARRA Project Cumulative	<p>ALIGNMENT</p> <p>Organizations have different structures and goals, shaping project delivery parties along common project goals and creating a sense of project ownership among the team are key components of a collaborative team approach. Achieving alignment between these often heavily interdependent project leadership:</p> <p>The level of clarity defining goals and objectives was directly related to effective communication. Facilitating focused meetings is a key strategy that project leaders can employ to ensure goals, objectives and priorities are effectively communicated to the team that most matter. Logistical and Process Strategies and Effective Communication:</p> <p>Another leadership capacity factor impacting team alignment is the ability to clearly assign responsibilities while holding parties equally accountable. Teams requiring their leaders did not equally hold/assign parties accountable had low levels of trust and respect, conditions that make alignment difficult. Higher levels of alignment were evident in cases where team leaders established clear deadlines, assigned responsibility in open forum, and objectively held parties accountable with consequences for missed deadlines or lack of follow through. The majority of teams used conventional project tracking protocols, such as Email spreadsheet logs of open items and RFI. Tools or metrics that could establish team performance goals, highlighting areas for improvement or setting incentives for parties to fulfill obligations were rarely used. The lack of flexibility could support project leadership in holding parties equally accountable and can distribute accountability amongst the team to a more peer-to-peer system, relying less on project leadership capability.</p>										
Whipple	<p>The first critical variable is the level of clarity to which leaders defined project goals and objectives. When the USA leadership set clear objectives and criteria for making decisions and clear expectations for results, teams reported they worked towards the same goals. The complications of ARRA projects experienced was frequent change in goals, objectives and requirements, particularly early in the delivery process in GSA regional and national were refining ARRA criteria. It was challenging for most teams to maintain team alignment during this time. In the cases where leadership capability was weak, project teams were rarely clear on goals and had difficulty negotiating the variable demands and changing objectives. In teams with stronger leadership capability, project leaders acknowledged the complexity of the situation and effectively communicated the changing demands. All teams were frustrated by changing goals, however great leadership resulted in better relationships within the team while strong leadership supported evident teams which adapted and engaged in the project context.</p>										
State Street South											
McNamara											
ICC											
Park											
	CONTEXTUAL & REGION FACTORS		ORGANIZATIONAL STRATEGIES		TEAM OUTCOMES		DEGREE OF IMPLEMENTATION				
			Clear Objectives Legal Accountability		Effective Communication		High Moderate Low				

← **CATEGORY TABS**
(Overview, Key Ingredients, Team Outcomes)

← **CASE DATA AND NARRATIVES**

← **FOOTER FOR TEAM OUTCOMES**
(Identifies degree of implementation of Key Ingredients most frequently linked to a specific outcome)

↑
PROJECTS

DEFINITIONS - KEY INGREDIENTS

LEADERSHIP STRATEGIES

Equal Accountability

- Hold all parties responsible for performance, without favoritism or bias, in achieving goals, deadlines, and promises

Clear Objectives

- Define project goals, priorities and constraints then communicate them to entire project team

Prepare for Complexity

- Evaluate and identify project complexities and potential risks early and collaboratively

Process Planning

- Develop and implement operating procedures (such as communication and decision-making protocols, meeting formats, tracking methods, etc) through early and collaborative discussions of project-specific context

Clear Roles

- Define role and responsibilities for all project decision-makers, participants, and stakeholders then communicate them to entire project team

Support Collaborative Input

- Implement contractual and/or project operating procedures that reduce barriers between disciplines and encourage interdisciplinary collaboration for development of design documents and construction planning to address project-specific goals and complexities

Quality and Reliable Information

- Ensure information used for design and construction decision-making is dependable and accurate, avoiding decision reversals and unforeseen issues

LOGISTICAL & PROCESS TACTICS

Meeting Frequency

- Appropriate number of regular face-to-face meetings that effectively use people’s time and complete work efficiently; meeting frequency evaluated for effectiveness throughout delivery

Tracking & Deadlines

- Tools (such as logs or Project Management software) and protocols that: assign responsibility, track design and construction issues, record goals achieved/missed, record status and resolution of issues
- Metrics compiled at a regular intervals to improve operations

Focused Meetings

- Meetings with clear agendas that define topics and stay on schedule so the right people are engaged effectively
- Tracking tools to communicate meeting goals, set priorities, guide discussions and record decisions

Right People

- Timely engagement of appropriate expertise (decision-makers, interdisciplinary experts, and project stakeholders) for specific decisions

BIM (Building Information Model)

- Digital design and construction production tool that supports interdisciplinary communication and coordination

Email/Project Management Software

- Digital communication tools that enable interdisciplinary communication and coordination, most effective when combined with tracking procedures

Co-location

- Shared office for interdisciplinary core team members (minimum owner, architect, CM), often located at the construction site. For the purposes of this study, a project was considered to have a high degree of co-location where core team-member organizations’ offices were located very close to the project site allowing team members to frequently working on-site (2-3 days per week)

DEFINITIONS - TEAM OUTCOMES

For the purposes of this report, we have defined the following team outcomes according to characteristics or markers that we have consistently found over the course of studying collaborative project delivery.

TEAM COLLABORATION

Alignment, trust and respect are all present

Alignment

- Team members clearly understand owner expectations/criteria and can clearly articulate how they relate to project goals.
- Team aligns around shared goals and demonstrates shared ownership of project outcomes.

Mutual Trust & Respect

- Occurs when individuals feel an obligation to fulfill commitments and do not place blame on other team members for an oversight or issue.
- Effective use of informal conversation as a communication and decision-making tactic.

TEAM PERFORMANCE FACTORS

Effective Communication

- Characterized by open and straightforward dialogue.
- Information shared is accurate (high quality), timely, and reliable.

Risk Management

Identification and mitigation of risk in the following areas: financial, schedule, transactional (process), design/technical, and construction.

Quality and Efficient Decision-Making

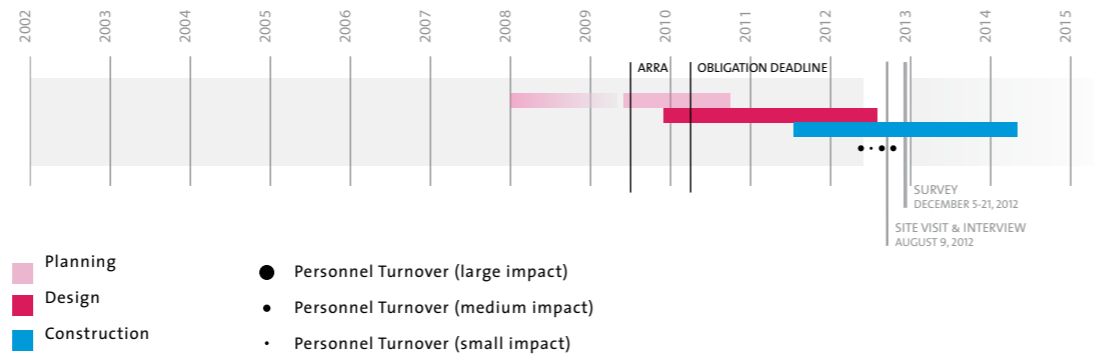
- Decisions are based on high quality information.
- Decisions are rarely reversed, low frequency of major unforeseen issues (because risks were effectively mitigated or avoided).
- Increasing speed of decision-making does not significantly increase risk,
- Decisions are timely, no delays that cause contraction in scope or limit design or construction options.

GRAPHICS KEY

Throughout this report we employ multiple graphic strategies to visually illustrate data. Guidance on how to read the diagrams follows.

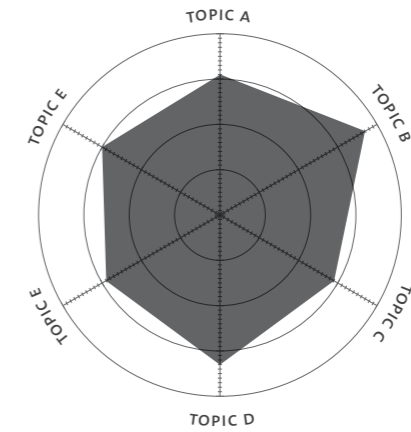
TIMELINE

Each project’s design and construction phases are shown by horizontal colored bars, pink for design and blue for construction, set along a timeline showing the years and months. Significant decision dates or deadlines are shown by labeled vertical lines that intersect each project to make visible when significant dates impacted each project relative to the project’s level of development. Black circles represent personnel turnover and the approximate phase of impact. The size of the circle indicates the degree of impact the personnel change had on the flow of the project. Large circles indicate a high level leadership change resulting in a significant transition period due to loss of embodied history, knowledge an or expertise; smaller circles indicate a less significant personnel change and more manageable transition period. The period of time data for this report was collected is indicated by white area with specific dates noted by a labeled vertical line.



SPIDERGRAPH

Each “spoke” of this radial graph represents a different category of topic. Project teams were interviewed and surveyed for each topic; scores were recorded based on a 1 to 5 scale, low to high respectively. These scores are plotted along each spoke. Connecting points creates a filled area, which is a visible map of self-reported strengths and weaknesses within each team.





CREDITS

RESEARCH TEAM

Renee Cheng, AIA, University of Minnesota – School of Architecture, Principal Investigator

Katy Dale, Associate AIA, University of Minnesota – School of Architecture, Primary Author and Coordinator

Kai Salmela, University of Minnesota, Research Assistant and Graphic Designer

SURVEY DEVELOPMENT AND ANALYSIS CONSULTANTS

Dr. Carrie Sturts Dossick, PE, University of Washington - Department of Construction Management

Dr. Gina Neff, University of Washington - Department of Communication

Rahman Azari, Ph.D. Candidate in Built Environment, University of Washington

STUDY CONTRACTED AND MANAGED BY

Charles Hardy, GSA

Tom Brauer, AIA, 4240 Architecture Inc

John Frendreis, GSA

Dan Schlacks, GSA

ARRA REGIONAL INFORMATION PROVIDED BY

Lucrezia Patrino, GSA, Regional Recovery Executive

Joseph Ratkovsky, Ozanne Construction Company, Inc.

Anthony Venticinque, GSA



OVERVIEW

KEY INGREDIENTS

TEAM OUTCOMES

At a Glance

Context

Timelines

Leadership Strategies

Logistical & Process Tactics

Alignment

Mutual Trust & Respect

Effective Communication

Risk Management

Quality & Efficient Decision Making

ARRA Project Cumulative

Whipple

State Street South

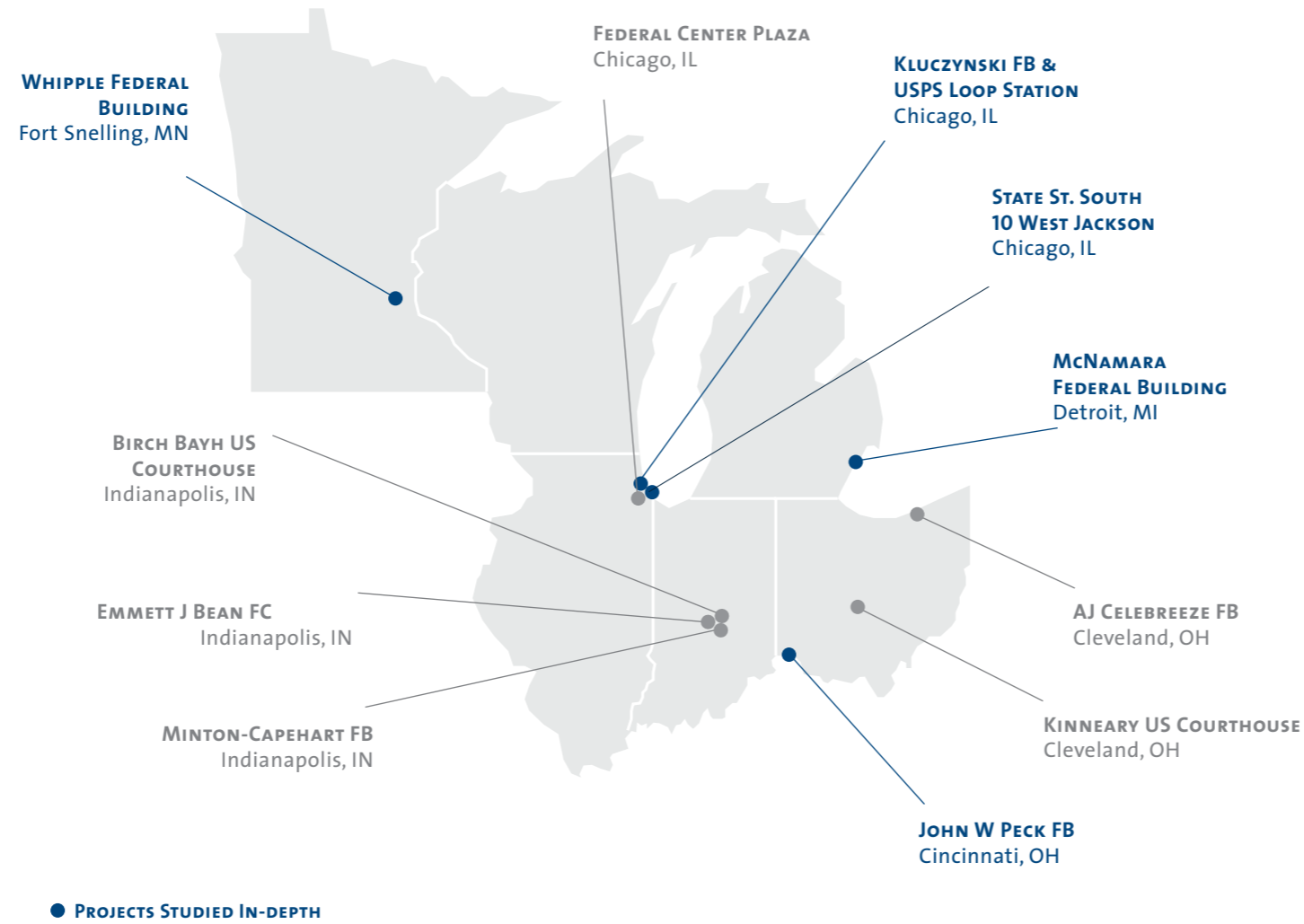
McNamara

JCK

Peck

AT A GLANCE

MAP OF GSA REGION 5 ARRA PROJECTS



OVERVIEW

At a Glance

Context

Timelines

KEY INGREDIENTS

Leadership Strategies

Logistical & Process Tactics

TEAM OUTCOMES

COLLABORATION

Alignment

Mutual Trust & Respect

TEAM PERFORMANCE

Effective Communication

Risk Management

Quality & Efficient Decision Making

ARRA Project Cumulative

Whipple

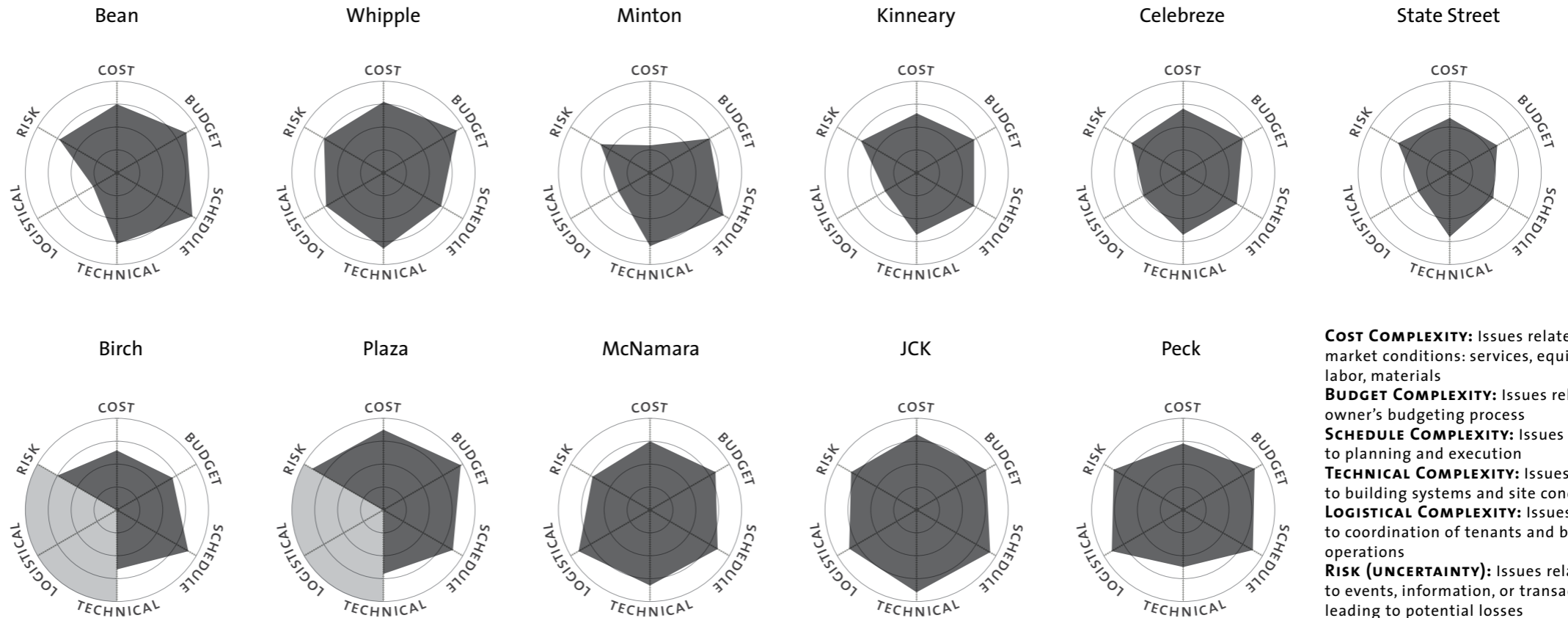
State Street South

McNamara

JCK

Peck

CONTEXT



Light gray indicates missing data

- COST COMPLEXITY:** Issues related to market conditions: services, equipment, labor, materials
- BUDGET COMPLEXITY:** Issues related to owner's budgeting process
- SCHEDULE COMPLEXITY:** Issues related to planning and execution
- TECHNICAL COMPLEXITY:** Issues related to building systems and site conditions
- LOGISTICAL COMPLEXITY:** Issues related to coordination of tenants and building operations
- RISK (UNCERTAINTY):** Issues related to events, information, or transactions leading to potential losses

These spider graphs illustrate the complexity and risk factors for all eleven ARRA projects studied.

In general, the ARRA projects had similarly high degrees of complexity. The ARRA schedule fast-tracked the design, but construction schedules were more conventional. Many projects required renovations to older systems, creating high levels of

technical complexity. Most projects had tenants who remained in the building during construction, which posed some of the most significant logistical challenges. Risk and uncertainty is typically higher for GSA projects than commercial projects given the high number of participants, stakeholders, and tenants who need to be coordinated.

OVERVIEW

At a Glance

Context

Timelines

KEY INGREDIENTS

Leadership Strategies

Logistical & Process Tactics

TEAM OUTCOMES

COLLABORATION

Alignment

Mutual Trust & Respect

TEAM PERFORMANCE

Effective Communication

Risk Management

Quality & Efficient Decision Making

ARRA Project Cumulative

Whipple

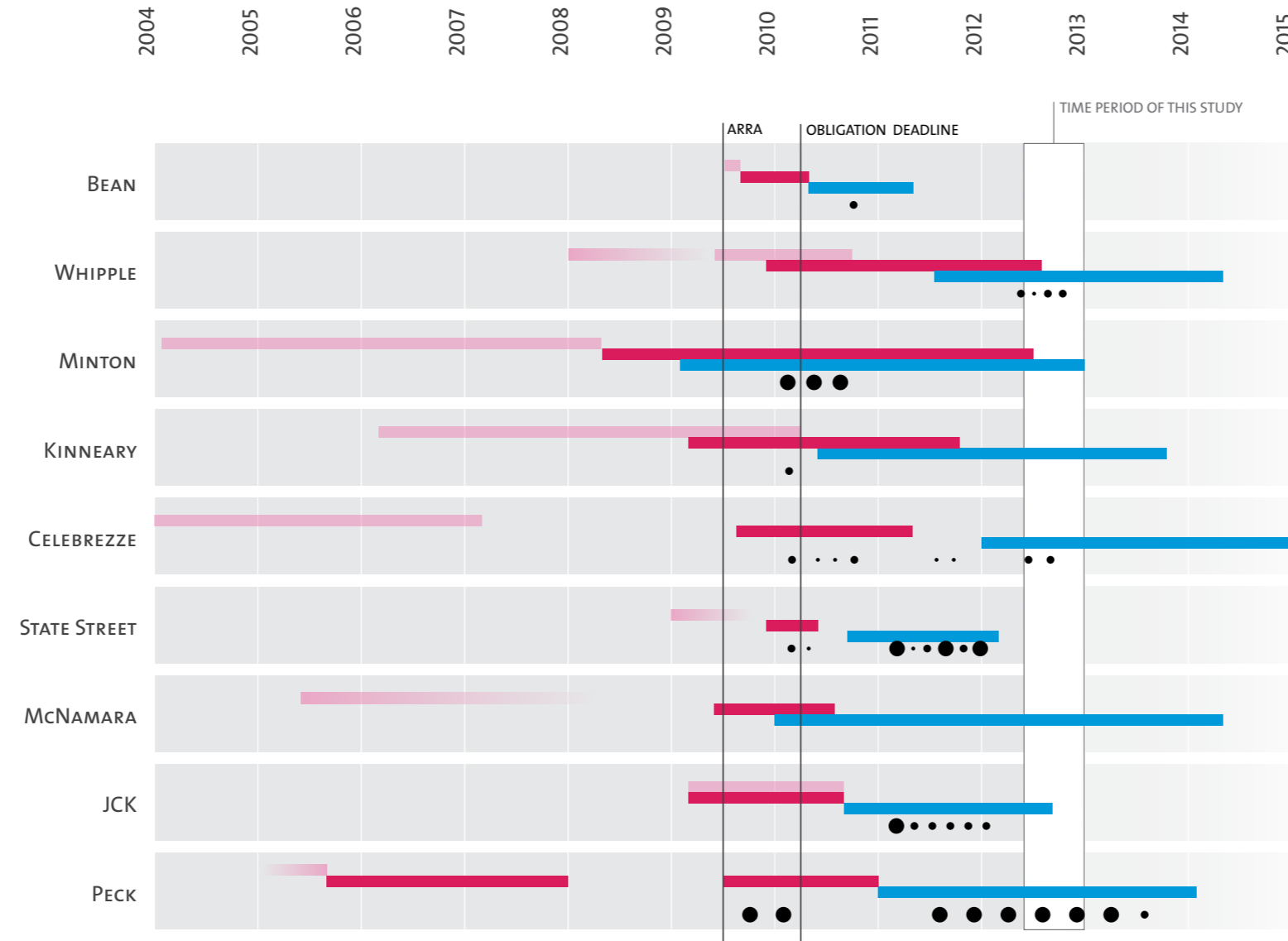
State Street South

McNamara

JCK

Peck

TIMELINES



The timelines indicate the developmental stage of each project at the time the ARRA was initiated. Common deadlines, such as obligation dates, are also noted. This graphic comparison shows that some projects had a long history prior to the ARRA (indicated by colored lines starting to the left of the ARRA line). Some projects started design (dark pink) at the time of the ARRA and overlapped with construction (blue lines); some had relatively short design phases that did not overlap with construction. Some projects began construction almost immediately after obligation deadlines, while others lagged. All projects experienced turnover (black circles), although some more than others and some with greater negative impact (indicated by the size of the black circles).

- PLANNING
- DESIGN
- CONSTRUCTION
- PERSONNEL TURNOVER (LARGE IMPACT)
- PERSONNEL TURNOVER (MEDIUM IMPACT)
- PERSONNEL TURNOVER (SMALL IMPACT)

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative

Whipple

State Street South

McNamara

JCK

Peck

LEADERSHIP STRATEGIES

Capable project leadership is a key ingredient in creating a high-performing, collaborative team. Project leadership sets the tone of a project. Strong leaders use multiple strategies to guide and support the team: prepare the team for complexity, promote collaborative input, plan work-flow processes, clearly define and communicate project objectives, assign roles and responsibilities, and maintain accountability.

In cases where the GSA leadership was less capable, process-management strategies could distribute leadership and provide paths for communication and decision making among the project team. This situation arose when at least one party outside the GSA stepped up to lead—typically the architect or the CMc.

Preparing for project complexity is the responsibility of project leaders. All construction projects contain risk, but complex tenant logistics and the unpredictable nature of renovating older facilities made all ARRA projects high or very high risk. Increasing risk leads to increased complexity, requiring collaborative input of knowledge and experience from several disciplines to mitigate risk. Leaders must seek out and respond to input and guide the team to develop strategies to navigate complex situations. Strategies could include communication plans, decision-making processes, strategies for meeting deadlines or guidelines, and protocols for deferring decisions to higher-ups to resolve significant issues.

Leaders must find firm but flexible ways of reviewing work processes throughout the course of the project delivery, adapting as goals and participants change over time. Peer reviews were effective at identifying areas for improvement; however, follow-throughs are the responsibility of the project leader. Several projects did not successfully implement or improve processes due to core team leadership deficiencies.

Project leaders, particularly GSA project leaders, are accountable for clearly defining project objectives, goals, and decision-making criteria. This was a challenge with the ARRA projects, as outside pressures often acted to change goals, priorities, and criteria. Teams in which leaders struggled to communicate project objectives lacked alignment around common goals and did not make high quality, efficient decisions. When priorities and criteria were unclear, team morale suffered, and members reported anxiety about decision making, feeling they were not able to provide value to the GSA or the tenant organizations.

Teams criticized some leaders who failed to hold contract parties equally responsible, a situation that negatively impacted team relationships and attitudes. Defining responsibility, assigning deadlines, and tracking completion metrics maintained an objective method for holding parties accountable. Without equal accountability, team members can grow resentful of both the leaders and the partners, preventing trust, respect, and alignment from forming.

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

LOGISTICAL & PROCESS TACTICS

Logistical and process tactics were identified by the QCA survey analysis as a causal variable in both the “kitchen sink” model and the “parsimonious” model, (see also *Research Methodology and Survey Findings – Survey Results*). This shows that effective implementation of process-management tools is the best indicator of project success on less-complex and lower-risk projects and also an important factor in highly complex projects that require multiple strategies to work in concert. Logistical tactics involve the orchestration of resources, such as co-location to bring the right people together, or the use of technological tools, such as BIM to record information. Process tactics are specific operating rules, or protocols, for managing communication and information sharing, such as plans that define paths of information flow or meeting formats that guide team interaction.

Meetings were the primary tactic for communication, information sharing, and decision making for all ARRA projects. Regularly scheduled meetings alone, while important for bringing the team together, did not ensure a high-performing, effective team. Successful meetings are well facilitated with focused topics and clear goals and objectives. This requires leaders to consistently set clear expectations for meetings. Questionnaire comments stressed improved meeting effectiveness achieved by sequencing core-team meetings to review key messages and goals prior to larger team meetings.

In every project there were examples of focused meetings, such as Core Team Meetings, Design Comment Open Houses, Onboard Design Reviews, “submittal parties,” and “coordination parties.”

Successful meetings include decisions makers, interdisciplinary experts, and stakeholders. However, too many attendees can lead to inefficient gatherings. Leadership strategies that engage in early planning of work processes and role definition lay the groundwork for including the appropriate people at meetings. Communication plans and matrixes defining team-member and stakeholder roles and responsibilities may be used continually to determine meeting structures.

Leadership support is necessary for collaborative work. A collaborative-team approach uses input from a variety of experts to identify risks early on. Input that is high in quality and reliable leads to better decisions and more efficient decision making. Mechanisms for managing information may be necessary to help the team sort through competing perspectives. To leverage stakeholder comments without slowing down the project, a variety of tactics were used: clear timeframes for comments with deadlines and daylong meetings during which the design team could work directly with reviewers and stakeholders.

Frequent Peer Reviews were cited as positive reflective opportunities for the team to evaluate what was

working and what improvements were needed. Peer recommendations on process improvement were helpful but were sometimes ignored until just before the subsequent Peer Review.

In the questionnaire, technological tools and co-location did not emerge as critical tactics, although some interviewees cited BIM and co-location as beneficial. For teams that used technological tools or co-location, they were viewed as supporting relationships, communication, risk avoidance, and quality and efficient decision making. Co-location can help promote team building and effective communication through frequent face-to-face interaction and can also ensure the availability of key people for meetings and on-site reviews. Similarly, the use of BIM and other shared 3-D models of the buildings encouraged collaborative work, visual communication for detail coordination, and risk avoidance by populating the model with reliable site information to resolve conflicts prior to construction.

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

ALIGNMENT

Organizations have different motivators and goals. Aligning project-delivery parties along common project goals and instilling a sense of project ownership among the team are key components of a collaborative-team approach. Achieving alignment relies heavily on capable project leadership.

The first critical variable is the level of clarity with which leaders define project goals and objectives. When the GSA leadership set clear objectives and criteria for making decisions and explicit expectations for results, teams reported that they worked toward the same goals. One complication all ARRA projects experienced was frequent changes in goals, objectives, and requirements, particularly early in the delivery process, as GSA regional and national leaders were refining the ARRA criteria. It was challenging for most teams to maintain team alignment during this time. The project teams with leaders who focused on the day to day project needs were rarely clear on goals and had difficulty navigating the outside demands and changing objectives. Project leaders that focused on global project issues acknowledged the complexity of the situation and effectively communicated the changing demands. All teams were frustrated by the changing goals, but poor leadership resulted in broken relationships within the team while strong leadership supported resilient teams that adapted and realigned as the project evolved.

The level of goal alignment directly correlated with effective communication. Facilitating focused meetings is a key strategy that project leaders can employ to ensure that goals, objectives, and priorities are effectively communicated to the team (see also *Logistical and Process Tactics*, and *Effective Communication*).

Another leadership factor impacting team alignment is the ability to clearly assign responsibility while holding all parties equally accountable. Teams that reported leaders who did not hold contract parties equally accountable had low levels of trust and respect, conditions that make alignment difficult. Higher levels of alignment were evident in cases where team leaders established clear deadlines, made assignments for open items, and objectively held parties accountable for the consequences of missed deadlines or neglected follow-throughs. The majority of teams used conventional project-tracking protocols, such as Excel-spreadsheet logs of open items and RFIs. Tools or metrics that could establish team-performance goals, highlighting areas for improvement or creating incentives for parties to fulfill obligations, were rarely used. This kind of feedback could support project leadership by holding parties equally accountable and by distributing accountability among the team in a more peer-to-peer way, relying less on project-leadership exclusively.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
	Clear Objectives Equal Accountability	Effective Communication	High Moderate Low

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

MUTUAL TRUST & RESPECT

A collaborative team atmosphere depends greatly on mutual trust and respect. Project teams with trust and respect generally holds itself responsible in fulfilling obligations and maintaining straightforward, open, and professional communication without overtones of blame—even during the disagreements that inevitably surface during the course of delivering a project. Willingness to act based on informal agreements is another marker of trust and respect. In these cases, team members trust each other to fulfill obligations and are comfortable taking action without formalized commitments (although formal documentation typically follows).

Achieving mutual trust and respect also requires that project leaders hold parties equally accountable. In some cases, preferential treatment led to resentment among team members and a lack of trust in project leadership. When project leaders made it clear in words and actions that a lack of responsiveness was unacceptable, team members became confident about being able to rely on each others’ commitments. Team members also trusted that leaders would act if any party should fail to fulfill obligations.

Trust and respect take time to achieve, but there are strategies that can foster trusting relationships. Interaction is particularly important during the beginning of a project when team members are getting to know each other. Proximity plays a role, so strategies like co-location and frequent meetings provide opportunities for team members to meet face to face, become familiar with one another, and build relationships. During the early stages, it is also important for leaders to clearly define roles and responsibilities. Some ARRA projects reported early conflict due to a lack of understanding of roles. While it is possible to overcome early conflict, it complicates the establishment of trust and respect, and in some cases the damage can never be fully repaired.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
Co-location Meeting Frequency	Clear Roles Equal Accountability		High Moderate Low

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

EFFECTIVE COMMUNICATION

Effective communication and information sharing is the foundation of successful project delivery. Effective communication is marked by open, straightforward, and direct conversation, imparting reliable information of high quality.

In collaborative teams where trust and respect is shared and goals are aligned, effective communication comes naturally and conversations in meetings and other venues are open and direct, focused on the challenges at hand. When there is disagreement, team members respect each others' positions and work together to reach a resolution. They are also able to move on to new topics or issues without referring back to unrelated earlier disagreements. In teams where trust and respect is not present, communication between team members is ineffective, marked by the use of a disrespectful tone, raised voices, and finger-pointing. Information is neither communicated nor heard. In teams where the overall collaborative culture is less than ideal, effective leadership and process-management strategies can overcome barriers to productive communication. In particular, the structure and facilitation of meetings is critical.

To achieve effective communication, the quality of meetings was far more important than quantity or frequency. Leaders who consistently set clear expectations for meetings were successful in facilitating effective communication. One strategy commonly

praised in the questionnaires was the holding of a premeeting of core-team members to align on key messages and prioritize goals prior to larger team meetings. This resulted in clear communication at the larger team meeting, aligned the whole team around common goals, and focused team discussions with less wasted time and energy.

Getting the relevant people available at the right time ensures that the information communicated is of high quality and reliable. To do this, communication needs to be both inclusive (participation of interdisciplinary experts and stakeholders) and exclusive (only those who need to be included). The streamlining of communication—whether in face-to-face meetings or via email—means that it is focused and productive. Knowing who to employ and when requires team leaders to engage in early planning of work processes, including communication plans and clearly defined roles and responsibilities.

Other factors, such as technological tools and co-location, do not guarantee effective communication but can help improve quality and reliability of information. Both BIM and co-location (in the form of shared office or availability for on-site walk-throughs) improve communication by supplementing verbal information with visual information. Viewing an image or a specific site condition during discussion facilitates clear communication of quality information.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
Focused Meetings Right People Technological Tools Co-location	Clear Roles Equal Accountability	Alignment & Trust	High Moderate Low



ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

RISK MANAGEMENT

Risk is inherent in all design and construction projects. Project complexity is directly related to risk: increased complexity leads to increased risk. Complexity and risk derive from many aspects of a project, including scheduling, budget, technical design and construction logistics. In addition to those quantifiable factors, team relationships and processes can lead to transactional risk.

Acknowledging and identifying project complexity is a critical first step in preparing for uncertainty and risk. Starting a project before preparing for complexity unbalances a project team and increases overall risk. Unprepared teams lack clear goals and can unwittingly develop deeply rooted problems. In these cases, a great deal of effort must be expended in team building and process planning while at the same time keeping the project on track. If, however, goal alignment and relationship building are established early in design and delivery, the team is prepared to meet challenges throughout the project's delivery. Planning processes vary greatly in their format and duration; most critical to their effectiveness is the early timing in the sequence of the project life.

Leader support of early collaborative input from interdisciplinary team members helps pinpoint the risks on a complex project. Risks identified by each disciplinary expert provide well-rounded perspectives on the possible pitfalls and risks of a specific project.

For example, many teams faced complex construction logistics while working in occupied buildings. Projects supported by the CMc's involvement early in project planning resulted in innovative project-phasing schedules that helped guide design-deliverable priorities and better manage construction logistics and tenant relationships and expectations.

Expertise contributed by the CMc can be a significant advantage to early identification and mitigation of budget and logistical risks. ARRA funding and obligation deadlines allowed the CMc contracts to be awarded earlier than typical for GSA projects. Some teams needed to competitively bid scope changes to comply with the GSA's goal for competitive and fair contracting. Two cases had additional scope that was large enough to merit a second bidding process, and they were both won by the CMc who had been awarded the original contracts. The confusing contractual boundaries created by the separation of the original and new contracts (task orders) complicated project administration. Mitigating risks associated with redundant effort and additional tracking was more effectively managed by the project team with prior GSA experience.

For the team with less GSA experience, the dual task-order structure created confusion, particularly during the bid for the revised scope. To keep the second bidding process fair, this team limited the CMc's involvement to the original scope. Since the revised scope was heavily dependent on the original, design decisions were difficult to separate out, and the CMc's expertise could not be fully leveraged. After

the award, scope separation continued, creating extra effort tracking and accounting the two scopes.

The team with more GSA experience was able to mitigate risks by proposing an administrative memorandum that streamlined processes. The agreement, for example, allowed the CMc to issue a single subcontract with the two task orders tracked line by line item rather than two subcontract documents for each trade. The team also integrated the design into one technical document, without distinguishing the two scopes. Accommodating the dual contractual structure, while possible, added complexity and risk.

In cases where the project scope is revised, the value of an open competition should be weighed against the merits of continuity, especially in the case when the revised scope is integral to original scope.

BIM helped some teams foresee field conflicts. Most ARRA projects upgraded or tied into existing building systems. Renovation is more complex than new construction since there is high technical risk associated with unforeseen conditions and limited space in which to work. BIM populated with actual field-condition information allowed consultants, primarily MEP systems experts, to coordinate based on reliable information prior to construction, which helped identify and resolve conflicts prior to construction.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
BIM	Preparing for complexity Process Planning Quality & Reliable Information	Alignment and Trust	High Moderate Low



ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

QUALITY & EFFICIENT DECISION MAKING

Ideally, high quality and efficient decision making is a part of every project-delivery process. The economic stimulus goals of the ARRA required all projects to fast-track design in order to establish a Guaranteed Maximum Price (GMP) between June 2009 and March 2010. Additionally, project teams were expected to expedite outlays (payments) during construction. Fast-tracking tends to increase risk. Consequently, achieving efficient and quality decision-making under those conditions can be challenging.

The teams most successful at navigating the fast-paced design schedule did so by making quality and efficient decisions focused on clear goals, clear lines of responsibility, and processes that define a framework for decision making and other review and approval protocols. Clear goals kept the team focused on project priorities, and clear roles and protocols defined experts and decision-making pathways. For example, meetings such as “design comment open houses” and “submittal parties” defined a format for reviewing and approving designs or submittals. They gathered relevant experts in one place, focused on a few topics of importance, and kept the discussion on topic and aligned with project priorities. They also provided stakeholders access to designers, engineers, contractors, and industry experts, who could answer questions and concerns with quality information for immediate resolution and decision making.

Technological tools and co-location support reliable information (see also *Effective Communication*) for making quality decisions and facilitate efficiency. For example, BIM requires coordination between multiple disciplines, identifying design and technical risks prior to construction. This process improves the quality and reliability of information, leading to decisions that avoid potential field issues.

Co-location during design increases the chance that the right expert will be available to contribute quality information when decisions need to be made. During construction, interdisciplinary team members available on-site for walk-throughs can expedite issue resolution and decision making. Visual examination of a problem provides information that can be immediately understood, with far more efficiency than translating verbal descriptions into formal written Request for Information (RFIs), which can result in misinterpretation or multiple revisions and resubmittals. On-site, face-to-face conversations can reduce RFI processing time and improve efficiency of issue resolution and decision making.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
Focused Meetings	Clear Objectives	Effective Communication	High
Right People	Clear Roles		Moderate
Technological Tools	Process Planning		Low
Co-location			

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

AT A GLANCE



LOCATION

1 Federal Drive, Fort Snelling, MN

BUILT

1969

PROJECT START

Fall 2009 (Design)

ESTIMATED COMPLETION

June 2014

TOTAL PROJECT COST

\$171.8M (as of August 2012)

SIZE

684,952 GSF

PROJECT OVERVIEW

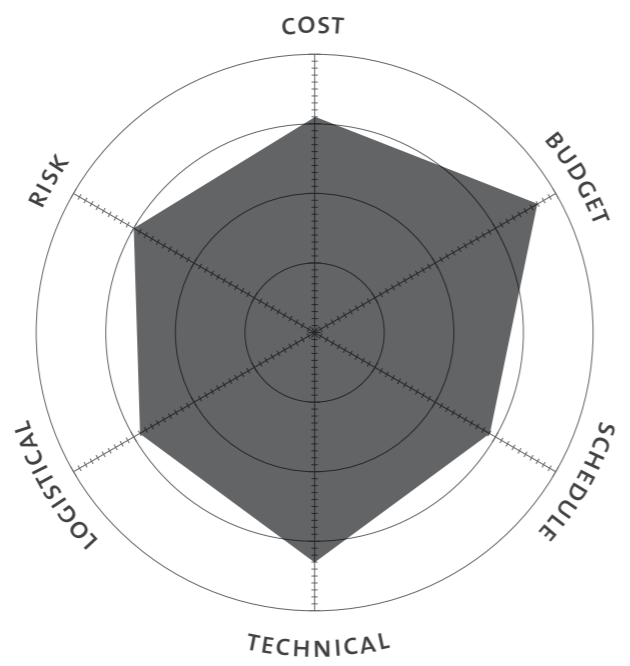
Today, the GSA, in its largest American Recovery and Reinvestment Act project in Minnesota, is applying an estimated \$158M in stimulus funding to replace the Bishop Henry Whipple Federal Building's existing, inefficient heating, ventilation, and air conditioning (HVAC) system with a new, state-of-the-art system that uses approximately 800 geothermal ground wells and that will be about 72 percent more efficient than a traditional HVAC system. The building's mechanical, electrical, lighting, plumbing, and fire-safety systems—some of which date to the original construction—will also be completely replaced. Energy savings for the overall project is projected to be about 30 percent from current annual costs.

Source of *text* from the project description on the GSA website.

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	COLLABORATION		TEAM PERFORMANCE		
					Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

CONTEXT



Cost Complexity: Market conditions were favorable for owner buyout of labor and materials.

Budget Complexity: There were some struggles due to uncertainty of funding sources, such as tenant contributions. Due to the obligations, the logistics of the budgeting process was atypically complex and required additional tracking efforts.

Schedule Complexity: From the architect’s point of view, there were many scheduling complications raised by fast-tracked design and late changes created by the addition of new tenants. The construction schedule was relatively straightforward; logistic challenges however, increased the complexity of the construction schedule.

Technical Complexity: This project was technically complex, requiring the integration of new, unfamiliar systems, including a large geothermal installation and PV panels, into old systems to allow for occupancy during construction, with the eventual complete turnover to the new system. Additionally, large amounts of asbestos containing material (ACM) needed to be abated.

Logistical Complexity: Originally, the Whipple building was expected to be unoccupied during construction, but the decision was reversed about one and a half years into the project. The building remained 50 percent occupied and operational during construction, complicating the technical-systems coordination. This also required extraordinary planning and coordination to minimize the impact on tenants. Additionally, six months after the decision to keep tenants in place, there was an alteration to the original tenant organizations, which required redesigns for new tenants.

Risk (uncertainty): Working with the GSA can lengthen and increase the uncertainties of the process, with the multiple participants and stakeholders involved. However, the members of this team were familiar with each other from working together on a previous GSA project, an advantage that reduced transactional uncertainties (see also **Risk Management**).

OVERVIEW

At a Glance

Context

Timelines

KEY INGREDIENTS

Leadership Strategies

Logistical & Process Tactics

TEAM OUTCOMES

COLLABORATION

Alignment

Mutual Trust & Respect

TEAM PERFORMANCE

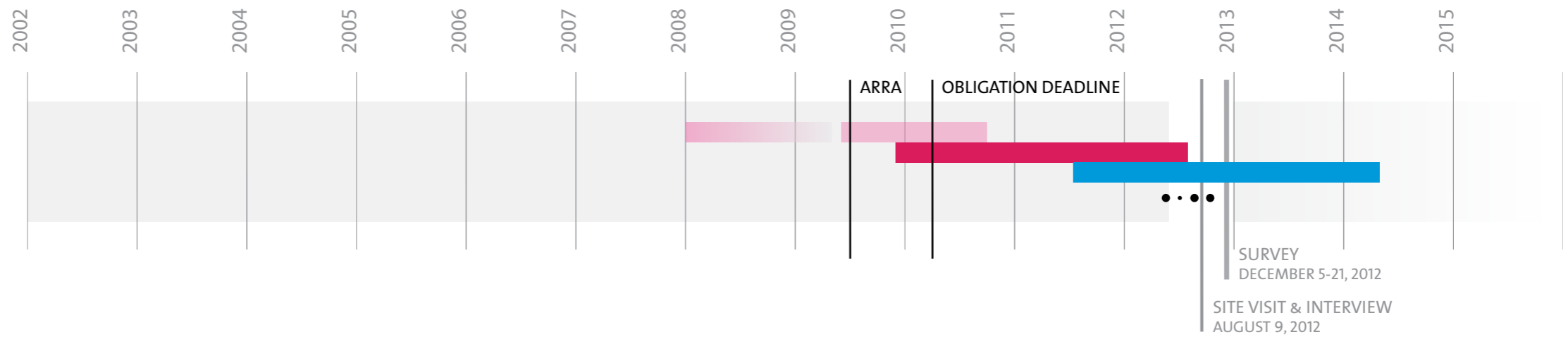
Effective Communication

Risk Management

Quality & Efficient Decision Making

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

TIMELINES



Original planning for the Whipple project was limited to a phased basic-systems upgrade. When the ARRA program requirements were announced, the team chose to disregard previous studies and developed feasibility studies with the new criteria in mind. The diagram shows how the team spent time investigating options and planning the project prior to full engagement in the design phase.

The team was highly stable, with little turnover, which helped to maintain continuity.

- PLANNING
- DESIGN
- CONSTRUCTION
- TURNOVER (LARGE IMPACT)
- TURNOVER (MEDIUM IMPACT)
- TURNOVER (SMALL IMPACT)

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

LEADERSHIP STRATEGIES

Whipple leadership recognized the importance of building a strong collaborative team to mitigate project risks and overcome complexities. Leaders were successful in preparing the team for complexity by defining and communicating project objectives, assigning roles and responsibilities, and being supportive and responsive to collaborative input.

GSA leadership clearly articulated goals and ensured that the core-team members were all on the same page. Alignment among the members ensured clear and consistent messages on the ARRA goals, and project goals were regularly repeated during larger-team meetings. Leadership support of the CMc and trade collaboration with the A/E team during design created a situation where all disciplines contributed to the design and understood the reason for decisions, creating a widespread sense of ownership and pride.

As one of the largest and most complex ARRA projects in the Great Lakes Region, the core team recognized the benefits (see *Risk Management*) of interdisciplinary input and lobbied to involve major trade contractors (mechanical, electrical, plumbing, and fire protection) during design. The CMc proposed a very integrated, three-tiered competitive bidding process to select trades to assist with design, attend meetings, and prepare budgets based on fees (rather than hard bids). This process is common in commercial practice but was new for the GSA. The major concern for the GSA was hiring contractors based on a limited description of work, but

the GSA agreed and the team found great value in trade involvement.

The Request for Proposals (RFP) included criteria that considered how the partners would “play together.” The GSA leadership emphasized to the trades: “You’re buying into the project, so you gotta be part of the team, make sure we’ve got everything covered, and you have to be reasonable.”

Major trades working on design assist were not required to submit hard bids but also were not guaranteed award of construction. To be awarded the next phase, their pricing had to be reasonable and their performance high, as “they could be thrown out any time if they didn't meet those requirements.” The core team found trade engagement during design significantly beneficial: subcontractors helped the team develop the complex technical design and provided quality field information that mitigated risk.

For the broader spectrum of trades, the process “varied [based] on how you bought out each CSI division and depended on phasing, complexity, and performance.” Similar to major trades, those that were reasonable were awarded a change order to continue. Occasionally, during the transition time between phases, scope of work would be issued for hard bids. Impetus for triggering hard bids varied: low performance, when engineers changed systems, and when there was significant lobbying in the outside market to provide job opportunities for other contractors.

Whipple project leaders regularly took a step back to evaluate the team’s work processes. Monthly executive meetings reviewed team operations and made changes as needed, such as providing additional staff or eliminating unnecessary meetings. This approach ensured team processes adapted to maintain efficiency throughout the entire delivery process.

All GSA projects require a communication plan, but implementation success varied. Whipple leaders prioritized communication of roles and responsibilities to properly direct issues and questions. Furthermore, Whipple leaders proactively scheduled reviews of communication plans at each milestone to accommodate any changes in personnel and/or processes during the various phases of delivery and to re-establish lines of communication (see *Effective Communication*).

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

LOGISTICAL & PROCESS TACTICS

Whipple exemplifies how strong leadership strategies work in concert with a range of logistical and process tactics to overcome a high degree of complexity. Team leaders successfully leveraged expertise, technological tools, and logistical tools to support the flow of information and to facilitate quality meetings.

Leadership support of integrated, collaborative input, through the early involvement of both the CMC and major trades, was critical to ensuring the participation of the appropriate individuals in meetings. The majority of meetings were interdisciplinary, providing a variety of expertise and contributing to the flow of reliable information and development of innovative solutions.

The use of tactics, such as co-location, and tools, such as BIM, further supported the collaboration of integrated team members. The close proximity of team members and on-site GSA leadership enabled frequent face-to-face meetings, easy interface with facility managers, and access to actual site conditions.

All major players used Revit. At the start of the project the software was not fully developed, and this posed some challenges for the team. But this obstacle was counterbalanced by the significant benefits rising from the process of coordinating the model and the clash-detection features. BIM coordination meetings were preceded by distribution of a clash report to the group. During the meeting, the group addressed clashes, and “at the end of the day, if there were things they couldn’t

do at the meeting, everyone agreed to make changes at night so the next day they had a brand new model that was ready to go.”

The facility-management representative provided input on technical issues related to building maintenance and operations. Access-clearance dimensions were incorporated into the Revit models, resulting in more accurate information with which to avoid operational problems that might not have been identified until late in construction.

Process tactics, such as protocols for meeting preparation to ensure quality information is provided to the right people, can significantly impact efficiency and decision making. The Whipple GSA team leaders required each organization to assign topics and responsibilities to specific individuals. For example, in preparation for a meeting, one individual would be designated to distribute updated information for participants to review in advance. These defined roles help indicate the pertinent people to participate in subsequent decisions. Finally, decisions were documented, tracked, and communicated using project-management software, such as Newforma and Proliance.

Decision-making protocols can prepare teams for handling issues as they arise. For example, all GSA projects require any financial changes and obligations to go through the GSA Contracting Officer's Representatives (COR). The Whipple team was deliberate in their process: no requests were made unless they had been fully vetted. If there was a cost impact to an RFI or an unforeseen condition, the

CMc would first send the issue to the agency CM, who would take it to the A/E team for review and comment: “there’s a lot of hashing out that goes on ahead of time to make sure it is right.” After the agency CM approved the input, a recommended action would be sent to the GSA COR. Processes such as this provided a clear path for issue resolution and helped ensure sound recommendations.

	OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

ALIGNMENT

The Whipple project team members demonstrated alignment. They were unified in their embrace of ARRA objectives and internalized goals to define their own ambitious agenda. One team member noted, “we all felt that we had skin in the game, we were excited about [using] new technologies—we could explore new systems. We were all on board with it.” This attitude was widespread, from the core team to the field-level team.

Project leaders were clear about the ARRA objectives, and the team was particularly inspired by the ARRA high-performance and economic-stimulus objectives. The ARRA goals promoted new ideas and use of innovative technologies, which highly motivated the team. A team member commented, “the ARRA goals themselves were really the champion. They were really well written with forethought to push beyond the typical envelope. The bar was set high and to meet that it took real effort.”

The team expressed responsibility to provide jobs for colleagues in the design and construction community, commenting: “It was a good time to keep people busy. So bring it on! We'll take everything you've got.”

The first peer-review session motivated the team to strive for even higher levels of achievement. The team understood the report message as follows: “You're emptying the building [of tenants] and you're only doing this much? Why aren't you doing more? Where's the

wow factor?” Team members used the peer critique as a springboard for envisioning an expanded project scope that achieved the most energy efficient and innovative options.

For six months the A/E and CMc collaborated to develop holistic options for the building and site. Six viable options were presented to the GSA ARRA Central Office Board. The team made a persuasive case for a geothermal and PV system, which the board approved. The project budget was increased in several stages from \$89M to \$160M to achieve the new goals. The revised scope also included additional improvements to office interiors, lobbies, and the site landscaping.

Project innovation was supported by the GSA’s regional and national leaders, and excitement around the project increased team alignment. The complexity motivated the team to prove they could achieve the challenging performance objectives. One team member described the shift: “It was a mundane project at the beginning, putting in the mechanical...there was no wow factor. The peer reviews started us going. The geothermal got us going, we [realised] we can do a lot of stuff!”

The ARRA goals and project goals were clearly communicated to the entire team through written and verbal means. Goals were defined in trade contracts and frequently discussed at meetings: “peer meetings, partnering meetings, we always emphasize why we're here and where we're going.” Consistent communication of project goals to the

field-team members lead to the discovery of innovative field solutions. For example, site work required the removal of several ash trees intended to be harvested for use as interior door veneer. Due to the presence of the emerald ash borer beetle, the Department of Natural Resources (DNR) would not allow the trees to be processed off-site. The superintendent suggested steaming trees on-site to kill the insects while preserving the viability of the wood. With DNR oversight, trees were steamed and the wood was used as planned.

It was a challenge for all projects in this study to resolve the sometimes contradictory requirements of individual tenants and GSA criteria—lack of clarity about these requirements can negatively impact alignment. In this case, the Whipple team dedicated personnel to manage representatives from each tenant and facility groups. This team drew on lessons learned from a previous GSA project and committed project managers from the GSA, the CMc, and the A/E to each tenant so there was someone who understood the needs of each building stakeholder. Also unique was a dedicated facility representative to interface with the project team. The team noted this as significantly beneficial: “He's here 100 percent, his main purpose is to look at the operations of the building to make sure that we're meeting the goals that he needs and the local service center needs to run this building once we're gone.” Dedicated staff required more financial support, but focused attention and continuity ensured the project team met tenant and operations goals and expectations.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
	Clear Objectives Equal Accountability	Effective Communication	High Moderate Low

	OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES			
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

MUTUAL TRUST & RESPECT

Markers of trust and respect were evident with the Whipple team in multiple ways. The study interview was marked with laughter, indicating a fun and informal team dynamic. Approvals and decisions were often made verbally with formal follow-ups, which kept the project moving and indicated trust between team members to fulfill their commitments. One team member described their experience as “about as comfortable a project I have worked on.” Another echoed that “it’s on my top 3 list.” The team was committed to success and did not resort to blame: “We all figured out what we’re all looking for. And we all knew if an issue came up, we’re not going to look backwards and go, well who came up with that idea? We all bought in, we all solve it.”

The trust and respect can be attributed to several factors, including continuity among team members, clear roles, co-location, frequent face-to-face meeting, and a partner-selection process unique to the GSA.

The continuity within the core team was essential to the culture of collaboration and the continuum of knowledge on this project. Integrated design began from the start, supporting relationship building and project buy-in. Early on, the GSA requested that each company name key players and ensure that they stay engaged with the project through completion. One team member described the problems inherent with discontinuity, when new team members “end up circulating back and

second guessing what the previous one did. We know why we arrived at something—whether it was right, wrong or otherwise. We got there together and we all got skin in a game. This [project] could have been the biggest nightmare in the world if you keep plugging in new people.” Some team members indicated the commitment of key players for the life of the project is critical on projects like Whipple, which have long—three to four year—trajectories. Although there were some challenging personnel changes, particularly from the CMc, the majority of the core members were active on the project as of the completion of this study.

Most GSA projects involve many team members, GSA stakeholders, and tenant organizations. In groups of this size, a clear understanding of responsibilities and accountability is necessary to arrive at quality information, answers, and decisions. Many ARRA teams struggled with decision making—issues often persisting in the absence of a clearly designated decision maker. Confusion and lack of progress can frustrate teams and undermine trust and respect. The Whipple team made a point of having each partner organization assign individuals to specific scopes, trades, disciplines, tenants, etc., so that it was clear which team member should be approached for specific issues or questions. This system allowed team members to make autonomous decisions, building self-confidence and helping to establish respect for other team members.

This team enjoyed a high degree of co-location with GSA project management, the CMc and agency CM on-site, and

frequent visits from the A/E team. Frequent face-to-face interactions helped team members gain familiarity, build trusting relationships early in the project, and maintain them through construction. Co-location supported strong relationships and communication as described by a team member: “[At] the [RFI] meetings, our construction meetings, and the site meetings, everybody’s there and we are discussing issues as they come up on a weekly basis. I think we’ve all gained respect for each other’s capabilities even though [we don’t always agree], I think we all respected each other and the communication has been positive.”

This team recognized the transactional risk that comes with delivering a complex project. The Whipple team mitigated this risk by requesting in the RFPs that each firm propose how it would collaborate with the team. The selection process was interdisciplinary, involving the core-team members from different stakeholder groups. The engineers and subcontractors under consideration were all equally qualified, so the core team collectively drew on their past experiences with the firms to help make selections. The core team established qualitative criteria to measure positive and negative characteristics of competing firms. For example, some were known to be “a good performer, they did their job, they [did] what they said they were going to do, [and] they didn’t try to blame some one else.” Negative characteristics were also noted, “if they were [known to be] argumentative, hard to work with, and didn’t stand for what they said”.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
Co-location Meeting Frequency	Clear Roles Equal Accountability Continuity		High Moderate Low

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

EFFECTIVE COMMUNICATION

Strong alignment, trust and respect among Whipple team members were key ingredients that contributed to frequent and open communication. The team firmly established a collaborative culture that successfully implemented several process tactics, including focused and frequent meetings, support for collaborative input, engagement of the right people, and use of technological tools. Together, these tactics provided an effective operating system for the team to communicate quality and reliable information.

For this team, meeting frequency and focus evolved with changing project needs; however, each meeting consistently had a process to prepare, track, and record issues and resolutions (see also *Quality and Efficient Decision Making*). The team met frequently, noting that the intense meeting schedules related to the nature of the project, with more participants, stakeholders, and oversight than a non-GSA venture. Additional meetings occurred as specific needs arose; however, the team noted that “if a [regular] meeting’s usefulness ends, it goes away. We are not just holding them to have fun you know.”

Although the communication system of meetings evolved over the course of the project, the change was guided by monthly core-team executive meetings during which project goals were reviewed and issues

were identified. As one member commented, “Usually the communication piece is a big part of that [monthly] meeting. Where isn’t the communication working? Where are the problems and how can we fix it?”

Early communication planning is a standard requirement of the GSA project-management plan. In this case, the GSA leadership team recognized the importance of effective communication and ensured that it was properly developed and implemented. In 2010 the Whipple team held two meetings to develop the lines of communication. During these meetings, the GSA required each partner organization to clearly identify responsibilities and to delegate them to specific team members. Going beyond the standard level of delegation, both the A/E firm and the CMc assigned individuals to specific tenants so that all team members, tenants, and facility managers would know who to include in meetings and to whom questions and issues should be directed. The team recognized the importance of revisiting communication plans to make adjustments and ensure proper implementation. At the time of the interview, the team had a Communication Planning meeting scheduled for the following week, to review their existing plan, to “re-establish [the plan] and make sure everybody knows who they’re supposed to be communicating with.”

The Whipple team effectively leveraged technological tools to share information. The A/E and agency CM used

Newforma, a project-management software, to distribute drawings and to track emails and meetings minutes. The CMc used Proliance, another project-management platform, which is also the basis of the GSA’s electronic Project Management (ePM), for RFIs and submittals. All items were eventually uploaded to the GSA’s ePM, but the ePM was not the primary method for communication, since firewalls and restrictions used to protect proprietary information also limit its capability. The team found their commercial software platforms to be much more accessible and useful for frequent communication.

Co-location encouraged frequent communication. Common to other co-located ARRA projects, lines of communication were open, so all team members were current on project status and items could quickly be resolved.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
<ul style="list-style-type: none"> Focused Meetings Right People Technological Tools Co-location 	<ul style="list-style-type: none"> Clear Roles Equal Accountability 	<ul style="list-style-type: none"> Alignment & Trust 	<ul style="list-style-type: none"> High Moderate Low

OVERVIEW	KEY INGREDIENTS		TEAM OUTCOMES						
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

RISK MANAGEMENT

The project began as a relatively simple project—the original scope was a basic systems upgrade in an unoccupied building. The ARRA high-performance requirements inspired the team to scrap the original plan and design a project to meet the high-energy criteria. Within the first year, the project budget almost doubled, the scope increased to include innovative technologies, and it was decided that building would remain occupied and operational during construction. These changes made Whipple the largest and most complex ARRA project in the Great Lakes Region.

The Whipple team benefited from past working relationships: individuals from the GSA team, the CMc, and the agency CM had worked well together previously on the renovation of the Warren E. Burger Federal Building. The team acknowledged that starting a complex project with an established team significantly lowered the risk. Not all teams can stay together and benefit from established relationships; however, this team indicates the importance of beginning a project with a team built on previous experience or created through early use of team-building strategies.

The Whipple team benefited greatly from early and collaborative involvement of the CMc and major trades during design. This strategy could be a model for all GSA projects to build important team relationships and encourage all disciplines to take ownership of the design. This team elected to eliminate previous

designs and work together to develop a new, coherent, and compelling project. Collaborative input from the CMc and trades during design meant everyone had “skin in the game.” One of the most critical strategies this team used to manage project complexities was to involve the major trade contractors in design (see more under *Leadership Strategies*). Focused design meetings that involved the entire team allowed the Mechanical, Electrical, and Plumbing (MEP) trades to “listen to what we were talking about and [hear about] the hurdles that we were encountering. They helped us; they were the eyes and ears on the site here...I guess what we were trying to do was not design what we thought would work but more what we were really encountering in there.” Involvement of the trades ensured accurate and reliable field information—a key ingredient to managing technical risk and mitigating the impact of unknown field conditions.

BIM was used by all major organizations on this project. Lack of clarity regarding GSA’s BIM for facilities management (FM) standards added complexity to the project, requiring frequent meetings to parse the GSA’s long-term BIM FM objectives. Although this team and the GSA regional leaders collaborated to develop facility-management standards for BIM, project demands required the team to push forward with project development before BIM FM standards could be developed and implemented. Another challenge with BIM was that when the project started in 2010, certain versions of the Revit software, such as plumbing and civil, were not as fully functional as the

architectural and structural versions. The issues became apparent during the modeling of the first outbuildings on the site. Identifying software problems as risk, the team assigned an individual to create a shared Revit library of families and components, anticipating needs for modeling the main building and effectively mitigating the process risk. As the project progressed, the team found BIM very useful for clash detection that mitigated field risk. They also used BIM-coordination meetings to incorporate lessons learned as they moved from floor to floor.

Most projects struggle to balance budget with the scope. In this case, the budgeting process was very transparent, it was “all open communication, and nobody [held] cards to their chest.” The team was able to maintain critical scope without major compromises. To achieve this, the Whipple team reviewed the budget during monthly meetings and the ongoing cost estimates of design by the CMc. Constant consideration and collaborative input helped the team establish innovative cost-cutting solutions while keeping the scope intact. For example, the CMc proposed using the old boiler stack as the trash chute and building a temporary exterior boiler stack. This significantly saved costs by eliminating the scaffolding and enclosure needed for an exterior trash chute. Another example was a modification to the original phasing plan that condensed the tower and podium work from two phases to one. The phasing change reduced the overall length of the project and provided significant cost savings.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
BIM	<p>Preparing for complexity</p> <p>Process Planning</p> <p>Quality & Reliable Information</p>	Alignment and Trust	<p>High</p> <p>Moderate</p> <p>Low</p>



ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

QUALITY & EFFICIENT DECISION MAKING

Effective leadership strategies and successful implementation of logistical and process tactics enabled the Whipple team to fast track the design of a highly complex and innovative building solution and begin construction early to meet the ARRA economic-stimulus goals. This success depended on reliable and timely information, which ensured that decisions were made efficiently and avoided significant risk.

Quality and reliable information, necessary for making good decisions, depends on a host of strategies and tactics. This project embodied most of them, including effective communication, clear objectives, clear roles and responsibilities, the right people to provide interdisciplinary knowledge and ideas, and successful implementation of communication and review protocols.

Leadership on this project successfully set the stage by communicating project objectives, supporting a culture of collaboration, and distributing leadership throughout the team by assigning individuals specific responsibilities. This empowered team members to take ownership of the project. With a strong collaborative culture and clear communication channels, open and straightforward communication was easy to achieve and contributed to high-quality decision making.

Involvement of the CMC during design was critical for keeping the design and construction moving forward

to address the ARRA outlay goal pressure. The A/E and CMC worked together through intense coordination to determine the phasing of the design and construction. Based on the collaborative decisions, the architects were able to deliver CD packages in time to keep construction moving. The engineer noted that the involvement of the trades was critical: they provided reliable field information to keep the design moving forward while avoiding risks down the road. Reflecting back, the team could not identify any regrettable decisions; they noted that the pressure actually “helped make decisions we needed made.”

Meeting and software tools worked together to achieve timely review and approval processes. Regular executive meetings and project-management overview meetings helped operational protocols remain effective and ensured that changes were made as needed.

There was a range of topic meetings, such as integrated-coordination meetings, construction meetings, site meetings, RFI and submittal meetings, pay-application meetings, foreman meetings, and issue-specific meetings, as necessary. Each meeting had a process in place to prepare, track, and record issues and resolutions. The first critical piece was having dedicated team members responsible for certain areas, such as the RFIs. Core-team members did not need to attend all RFI meetings because responsible representatives from each organization would meet, resolve simple items, and pass on larger issues to the core team. Another critical piece of the process was the distribution

of information prior to a meeting. The CMC, for example, would distribute costs associated with each active (or “hot”) RFI prior to the meeting. This helped individuals prepare in advance so that decisions could be made efficiently. Distribution and tracking of items were streamlined by using project-management software, primarily Newforma during design and Proliance during construction. All information was eventually uploaded to the GSA electronic Project Management software, ePM, a Proliance-based system.

LOGISTICAL & PROCESS TACTICS

- Focused Meetings
- Right People
- Technological Tools
- Co-location

LEADERSHIP STRATEGIES

- Clear Objectives
- Clear Roles
- Process Planning

TEAM OUTCOMES

- Effective Communication

DEGREE OF IMPLEMENTATION

- High
- Moderate
- Low

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

AT A GLANCE



LOCATION
10 W. Jackson Blvd., Chicago, IL

BUILT
1948

PROJECT START
July 2009 (A/E Notice to proceed)

ESTIMATED COMPLETION
June 2012

TOTAL PROJECT COST
\$26M (as of August 2012)

SIZE
133,338 GSF

PROJECT OVERVIEW

The primary goal of the project is to make the 10 W. Jackson Federal Building (also known as State Street South) as high performance as possible and to increase the viability of this GSA asset while staying within the budget. In order to meet the design goals of the Statement of Work and the requirements of the ARRA and the Leadership in Energy and Environmental Design (LEED), the design approach for the building has been to reconcile as many of the project's disparate elements as possible while supporting these goals.

The ARRA's Chicago State Street South project will set a new standard for adaptive reuse. The added window glazing will provide the occupants with an exceptional work environment. The redesigned east curtain wall will add significant street presence on both State Street and Jackson Boulevard, exemplifying the federal government's commitment to urban cores. A new employee entrance and the new receiving room and trash room service areas will provide functionality required by the building's tenants while reducing vehicular traffic and increasing pedestrian use of Quincy Court.

The project includes repairing roofs, replacing windows, and installing a modern heating, ventilation, and air conditioning system that uses occupancy and carbon dioxide sensors to optimize energy use. When complete, the project will set a new standard for adaptive reuse and will exemplify the federal government's commitment to urban cores.

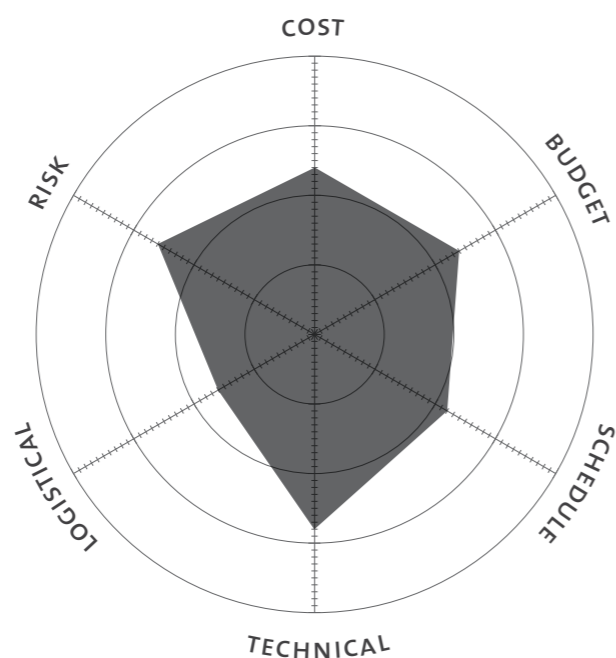
The 10 W. Jackson Blvd. (State Street) building will be completely modernized, including wall replacements to improve thermal performance and an upgrade of its mechanical, electrical, and plumbing systems. This building will eventually house offices for the Department of Labor.

Source of *text* from the project description on the GSA website.

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	COLLABORATION		TEAM PERFORMANCE		
					Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

CONTEXT



Cost Complexity: Market conditions were favorable for owner buyout of labor and materials.

Budget Complexity: The team felt the funding structure provided flexibility to obligate funds as appropriate. The ARRA's specific financial-reporting requirements increased work for the CMC compared to typical GSA projects. Reports specifying contract amount, outlays, and the number of jobs created by the ARRA were required quarterly, and the information was made public.

Schedule Complexity: Design experienced schedule complexity due to fast-tracking to meet ARRA outlay goals. Timing of some budget decisions created construction-schedule challenges. Additionally, changes requested by the City of Chicago were not always anticipated, and coordination of the infrastructure for the Commonwealth Edison (ComEd) vault and electrical service was largely in the hands of the city.

Technical Complexity: Systems upgrades were complex, but since the building was not occupied, the project was relatively less complex than other ARRA projects. However, the team did encounter challenges. New mechanical required significant coordination since old systems were poorly located for the new design and the desire to maximize the ceiling height compressed available space for HVAC.

Logistical Complexity: Tenant logistics were comparatively straightforward as all federal office tenants were relocated off-site. Unusual for the GSA, this building is mixed use with both retail and office spaces. Some retail venues remained operational, adding complexity to the site access and logistics.

Although mostly unoccupied, site access was extremely complex because of the location in a congested urban area. Access was limited to decorative public areas, and closing of major thoroughfares (Jackson Boulevard and State Street) had to occur mostly at night and required coordination by the City of Chicago. The Chicago Transit Authority needed to be consulted for rerouting of buses or temporary closure of the adjacent subway station entrance. City permits were granted and sometimes later revoked to accommodate local events, such as professional football games.

Risk (Uncertainty): Generally, the team rated risk as average given that all renovation projects have inherent risk in unknown conditions. What raised the risk slightly was the high profile of the project, extensive city coordination on-site with limited site access, the mixed-use program, and some of the more ambitious design goals in the curtain wall and the Quincy Court entrance. The ARRA program raised performance-measurement risks as the criteria evolved after the program began.

OVERVIEW

At a Glance

Context

Timelines

KEY INGREDIENTS

Leadership Strategies

Logistical & Process Tactics

TEAM OUTCOMES

COLLABORATION

Alignment

Mutual Trust & Respect

TEAM PERFORMANCE

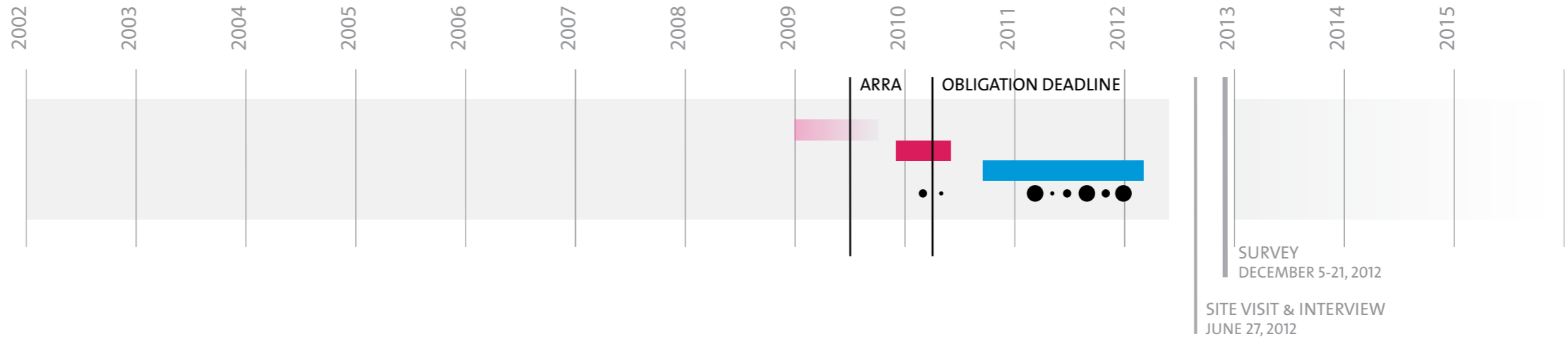
Effective Communication

Risk Management

Quality & Efficient Decision Making

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

TIMELINES



Some piecemeal feasibility studies had been done prior to the ARRA. When this team took on the project, they spent time evaluating previous work and building a plan more holistic than earlier ones. For the most part, this team eliminated previous design work and collaborated on a new and appropriate design that was able to address ARRA priorities.

This team had higher level of turnover than desired. However, effort was made to minimize impact and prevent additional turnover.

- PLANNING
- DESIGN
- CONSTRUCTION
- TURNOVER (LARGE IMPACT)
- TURNOVER (MEDIUM IMPACT)
- TURNOVER (SMALL IMPACT)

	OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

LEADERSHIP STRATEGIES

GSA leaders on the State Street project were effective in acknowledging complexity, defining roles, communicating project objectives and priorities, and encouraging collaborative input. Success in these areas contributed to a collaborative team culture, a key ingredient in effective communication and risk management.

Fast-tracked design is challenging, particularly in the context of the GSA, which requires input from a multitude of stakeholders. Leaders acknowledged this risk, and early on developed a list of core-team members and global-team members. This supported input from multiple stakeholders while streamlining the decision-making process. “The project manager was very proactive in getting all key players together for any important decision.”

Goals and criteria changed frequently within the ARRA context. The collaborative culture of this team supported open and transparent communication critical to keeping the team informed and aligned to shifting project priorities. Leaders were successful at encouraging collaborative input and were able to quickly translate feasibility and constructability information from the CMc into “deadlines and go/no-go decisions...[helping] the team work towards milestones.”

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

LOGISTICAL & PROCESS TACTICS

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

Several logistical and process-management tactics were successfully employed on this team, including focused meetings, right people (expertise), co-location, and technological tools. Capable leadership and collaborative culture supported the use of these tactics.

As common with ARRA projects, meetings were the primary mode of communication for this team. Meetings were effective because of clear definitions of roles, co-location, and thorough tracking and recording tactics. Clear role definition and co-location ensured that the right people attended meetings. Thorough meeting minutes kept the team “informed and on task for the following week’s meeting.”

Several meeting strategies were employed to improve efficiency and decision-making speed. “Design comment open houses,” daylong meetings held at the GSA headquarters, were held prior to milestone document submissions. During these meetings the design team and GSA reviewers assembled to close out all outstanding reviewer comments. During regularly held “submittal parties,” interdisciplinary participants reviewed submittals in a roundtable exchange. The strength of this format was promotion of direct communication in submittal review, “conversation [could] take place rather than written forms.”

The collaborative culture of the team coupled with co-location supported informal meetings, which can be the most efficient method for resolution of minor issues.

“Sidebar focused meetings with the ‘go-to’ people only” were highly effective for this team. Owner presence on-site was also noted as beneficial to communication, decision making, and timeliness.

Several survey comments identified Newforma as an efficient and effective tool for distributing documents to the team. This technology also facilitated tracking of documents, RFIs, submittals, and other construction documents.

	OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

ALIGNMENT

In this case, project leaders enabled strong team alignment by clearly defining both the broad ARRA goals and project-specific goals and by effectively communicating goals to the team.

This team effectively leveraged and honed their shared understanding of ARRA goals. The process of collectively defining their goals began during the ARRA Collaborative Summit. According to the GSA project manager, this meeting “created a culture and a sense of urgency for the team” that could be directly tied to coordinating the team for the early purchase of air-handling units and finishes to help meet ARRA outlay goals.

Another example of effective communication of project goals and priorities was the team’s concerted effort to provide optimal daylighting for the space. Given the building layout and orientation, it was not possible to acquire the Leadership in Energy and Environmental Design (LEED) point for daylighting that would have contributed to meeting the ARRA high-performance goals (LEED Gold); however, the team clearly understood that the GSA prioritized daylighting as intrinsically beneficial for all projects. For the good of the project, the team integrated their efforts to provide the most daylight possible, in spite of additional coordination required to create the high ceilings that maximized daylight.

This team, like others, expressed frustration with fluctuating ARRA requirements and objectives. In spite of their frustration, the team maintained alignment largely due to project leaders consistent openness and transparency regarding the larger political needs driving the changes. Leaders also followed through by clearly delegating responsibility to address requests. According to the GSA project manager: “We all knew that [additional reporting was] not on the top of our list of [things we] wanted to do, but it became the top priority [after understanding its role].” The comment illustrates the team’s sense of shared project ownership and responsibility.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
	<p>Clear Objectives</p> <p>Equal Accountability</p>	<p>Effective Communication</p>	<p>High</p> <p>Moderate</p> <p>Low</p>

	OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES			
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

MUTUAL TRUST & RESPECT

Like many ARRA project teams, the State Street team faced complex and unforeseen challenges that required mutual trust and respect to resolve. Most notable challenges were the ComEd vault replacement and curtain-wall mock-up failure. Facing these issues, the GSA project manager noted, “We had a lot of difficult conversations, but we got through it.” This statement indicates that the team maintained strong, respectful relationships, without resorting to blame, during difficult circumstances.

Close proximity of team members and frequent face-to-face meetings were likely key contributors to early team building. As soon as the CMc was brought on board, frequent meetings were held to evaluate the feasibility and cost implications of design options to meet the fast-tracked design schedule to target the March 2010 GMP deadline. The team’s first base of operations was the GSA Region 5 headquarters located on the same block in downtown Chicago as the project site. Frequent meetings helped build familiarity among team members, and clear definition of roles—from global stakeholders to the core project team—assisted the core team in managing the input from multiple sources and staying aligned. Over time and as most of the team was co-located on-site, the relationships became less formal with frequent sidebar meetings and informal on-site discussions. This indicates that team members trusted each other to fulfill obligations and freely discuss items off-line without excessive documentation.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
<p>Co-location</p> <p>Meeting Frequency</p>	<p>Clear Roles</p> <p>Equal Accountability</p>		<p>High</p> <p>Moderate</p> <p>Low</p>

	OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES			
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

EFFECTIVE COMMUNICATION

Communication on this team appeared open and straightforward, indicating high levels of alignment, trust, and respect. In high-functioning teams, co-location not only facilitates trust and respect, it makes direct communication much easier and promotes productive, informal conversations. As one team member described, “I don’t have to call [other team members] up or shoot them an email; I can just go into their office and talk to [them] when they’re here.” Communication of this character allowed for a great deal of flexibility and for the team to adapt as needs arose. Core-team members working on-site felt they were always “in-tune with what was going on.”

Project leaders effectively delegated responsibilities and clearly communicated roles and responsibilities. Early in the process, the team identified the need to define the core project team versus the global team (regional GSA leaders and other stakeholders). This clear delineation helped maintain consistent communication between the core team. If issues discussed in core-team weekly meetings could benefit from outside input, the team members could, together, identify additional attendees. Before the core-team strategy was developed, meetings had an unreasonably large attendee list, resulting in standing room only meetings with an overwhelming

numbers of opinions. Including the appropriate experts and excluding individuals from topics outside of their concern was key to keeping discussions on topic and managing the flow of relevant and quality information, both critical to effective communication.

Successful communication of quality and reliable information helped secure additional funds through the team’s presentation of a persuasive and timely rationale. Although many ARRA projects faced unforeseen conditions or budget challenges, this team was particularly effective in clearly communicating project needs to the GSA regional leadership.

LOGISTICAL & PROCESS TACTICS

- Focused Meetings
- Right People
- Technological Tools
- Co-location

LEADERSHIP STRATEGIES

- Clear Roles
- Equal Accountability

TEAM OUTCOMES

- Alignment & Trust

DEGREE OF IMPLEMENTATION

- High
- Moderate
- Low

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

RISK MANAGEMENT

This project faced a moderate to high level of complexity and risk. However, the team's early recognition of complexity, planning of work processes, and collaborative team culture (alignment, trust, and respect) helped minimize risk to the project and overcome the challenges.

The State Street project began prior to the ARRA with small, fragmented project proposals that lacked a holistic vision. When the ARRA launched, the GSA struggled to determine the needs and intent of the project as a whole. The design team encountered unclear program criteria and new ARRA requirements. To address this complex situation, the architect and the GSA project leadership led an exercise to evaluate options and reach a consensus with the GSA regional stakeholders about the project intent. Reconciling the many perspectives was difficult, but the process served to unify the team's understanding of the project from an early stage.

To better manage risk associated with uncertainty in program and budget criteria, the team elected to present project designs as a series of options. Individual pricing of these choices allowed the GSA to make selections that optimized value.

The team made a critical decision to abandon previously designed components of the project. The GMP process revealed that the entrance to Quincy Court, far

exceeded a reasonable budget for its scope. Based on this and other information, the CMc advocated scrapping all previous schemes and collaboratively (architect, CMc, and subcontractors) designing the project to fit the budget. State Street and Whipple both eliminated previous design work to holistically address the ARRA high-performance goals rather than attempt to modify the existing designs using a piecemeal approach. This decision may have helped avert challenges and risk that could have prevented State Street from achieving its intended scope. By contrast, the Peck project modified their existing design to accommodate completely different design and budget goals. The resulting risks and challenges made Peck less successful than State at delivering the scope within budget (see also *Peck, Risk Management*).

One of the major challenges this team faced was the Quincy Court entrance curtain-wall design. After the team rejected the original design, there was a very short time frame during which to develop a high-quality alternative that also met the budget. Contributions by the CMc and a curtain-wall subcontractor enabled the team to quickly test design iterations and develop an innovative, beautiful, and affordable solution to meet the design objectives. Unfortunately, the curtain-wall subcontractor involved with the revised design was not awarded the contract. The team struggled to find a subcontractor who could fully embrace the nuances of the design goals and ultimately changed to yet another subcontractor before achieving the final construction. Even after this change, other challenges led to

a failed mock-up test and additional funding was required to reach a successful outcome.

Capable project leadership supported, identified, and mitigated transaction risk for the team. For example, there was personnel turnover on the CMc team that was potentially problematic for the continuity of the larger team. Although this cannot always be controlled, the GSA project manager recognized the risk and held the CMc accountable for maintaining certain key staff for the remainder of the project to properly support the continuity of the team and project.

LOGISTICAL & PROCESS TACTICS

BIM

LEADERSHIP STRATEGIES

Preparing for complexity
 Process Planning
 Quality & Reliable Information

TEAM OUTCOMES

Alignment and Trust

DEGREE OF IMPLEMENTATION

High
 Moderate
 Low

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

QUALITY & EFFICIENT DECISION MAKING

Early on, GSA project leaders recognized that fast tracking design would not work with typical GSA review processes. Leaders successfully implemented multiple adjustments to ensure that contribution by experts was timely and reliable.

Two distribution strategies worked well: First, identify the individuals within the group who required information and at what level. The GSA project manager shared a list of critical team members (core) and reviewers (global). Second, the design scope required the architect to submit twenty paper copies of design documents, an increase from the GSA's typical six-copy requirement. The GSA project manager was also able to get the GSA global team to commit to a faster review period. These changes reduced the GSA's review time from the typical twenty-one days (seven days for assembling copies, fourteen for review) down to seven days.

Efficiency of meetings and timeliness of decisions greatly improved over time. Early in the design process, team meetings were held at the GSA headquarters and included all project members and GSA stakeholders. Meetings with such a very large group were long and rarely reached consensus. Once the team moved to the job site, the attendance dropped significantly and the group was able to work effectively. Project leaders recognized the importance of keeping the attendee list appropriate to the meeting and further improved

efficiency by dividing the critical list of team members into the core team and the global team. Decisions were made only by those on the core distribution list and excluded unrelated global-team members unless their expertise was required.

Facilitated meetings are a key ingredient to quality and efficient decision making. This team instituted a "design comment open house," a forum for the architect to respond to the final round of review comments prior to major milestone submissions. Because all ARRA projects occurred simultaneously, the availability of the GSA reviewers on any one project was limited. The open house ensured that the reviewers responsible for multiple projects dedicated face-to-face time with the State Street architects. Likewise, the architects had to be prepared to respond to all outstanding comments, directly remark on reviewers' queries, and immediately answer follow-up questions.

The co-location and close proximity of the core team to the job site benefited the speed and reliability of decisions. With frequent job-site meetings and co-location of the CMc and CMa, the core team was constantly aware of all project issues, whether high or low risk. Since the GSA team and architects were located within walking distance of the site, the core-team members were available to meet as needed.

LOGISTICAL & PROCESS TACTICS

Focused Meetings
 Right People
 Technological Tools
Co-location

LEADERSHIP STRATEGIES

Clear Objectives
Clear Roles
Process Planning

TEAM OUTCOMES

Effective Communication

DEGREE OF IMPLEMENTATION

High
 Moderate
 Low

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara**
- JCK
- Peck

AT A GLANCE



LOCATION
477 Michigan Avenue, Detroit, MI

BUILT
1976

PROJECT START
August 2010

ESTIMATED COMPLETION
2013

TOTAL PROJECT COST
\$56.3M (as of August 2012)

SIZE
800,000 GSF

PROJECT OVERVIEW

Modernization includes an FBI office build-out of eight floors (259,000 GSF) and the addition of an FBI-dedicated entry, conference center, mail room, and exercise areas. The north and south public lobbies will also be rebuilt to alleviate congestion, and the emergency generator and fire-alarm system will be replaced. Several federal tenant agencies that currently occupy some of these floors will be relocated either within the McNamara Federal Building or to a lease space.

Green Improvements

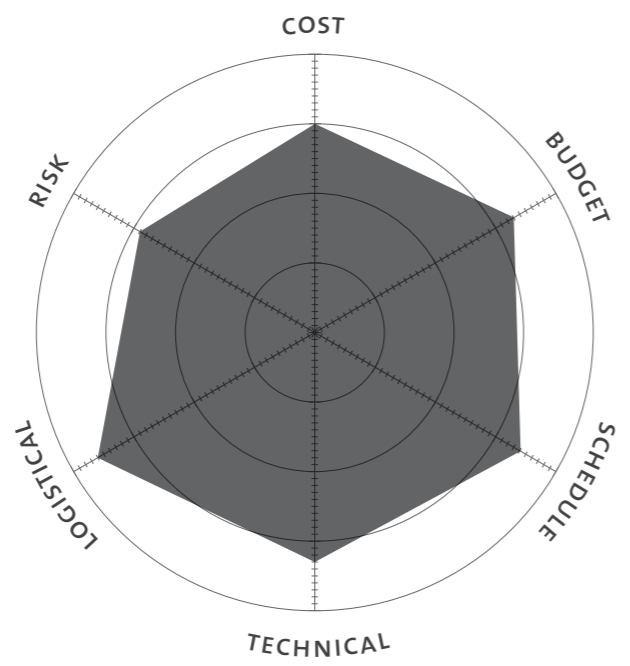
Energy-saving elements of the project include insulation around lobbies and entryways to prevent energy loss, low-flow plumbing fixtures to reduce water usage, and high-efficiency lighting with occupancy sensors.

Source of *text* from the project description on the GSA website.

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

CONTEXT



Cost Complexity: Market conditions were favorable for owner buyout of labor and materials.

Budget Complexity: The ARRA provided funds for the entire delivery process and allowed the CMc to be brought on board early. Budgeting was complex from the tracking standpoint. Funding sources varied, requiring the CMc to track independently.

Schedule Complexity: Design experienced schedule pressure to achieve the ARRA obligation deadline and outlay goals and to complete the construction documents so that the CMc could mobilize in early 2011. The construction schedule experienced less pressure.

Technical Complexity: This project faced complexities similar to those in other ARRA renovations: integrating new systems with the existing outdated ones while keeping the building operational.

Logistical Complexity: Tenants remained in place. Construction sequencing and coordination with building operations was complex. Additionally, the FBI, one of the anchor tenants, had strict security requirements above standard GSA clearances required for work in a federal building. Obtaining security clearances is a very time-consuming process for trades and increased logistical complexity.

Risk (Uncertainty): Multiple participants and stakeholders are involved in any GSA project. As coordination and communication demands increase, so does the transactional risks. In this project, the main tenants were highly involved and had their own construction-management division, requiring additional coordination.

OVERVIEW

At a Glance

Context

Timelines

KEY INGREDIENTS

Leadership Strategies

Logistical & Process Tactics

TEAM OUTCOMES

COLLABORATION

Alignment

Mutual Trust & Respect

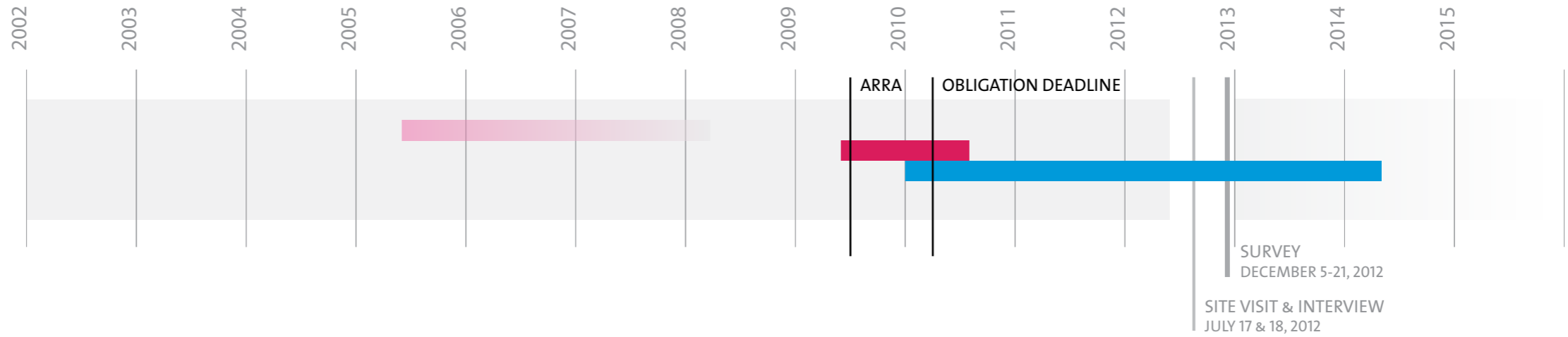
TEAM PERFORMANCE

Effective Communication

Risk Management

Quality & Efficient Decision Making

TIMELINES



The ARRA program provided the funds needed for the McNamara renovation and replaced earlier plans for a stand-alone building for the FBI, the primary tenant. The team struggled to integrate the FBI program of requirements, originally developed for a new, stand-alone facility, with the ARRA requirements for the renovation. The team successfully began construction early to meet ARRA outlay goals.

Turnover was not reported by team.

The time period of the interview and questionnaire occurred after the design was finalized and the construction was approximately 70 percent complete.

- PLANNING
- DESIGN
- CONSTRUCTION
- TURNOVER (LARGE IMPACT)
- TURNOVER (MEDIUM IMPACT)
- TURNOVER (SMALL IMPACT)

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

	OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

LEADERSHIP STRATEGIES

Leadership on the McNamara team appeared to be distributed among the core group, and communication appeared strong. The team benefited from early discussions on the flow of communication, roles and responsibilities, and decision-making hierarchy. Some roles were not clearly defined by leaders, leading to confusing communication pathways within the team and with GSA personnel and tenant organizations. Survey comments indicated that GSA decisions were not always timely and regular pressure to resolve issues was required, particularly early on in the project.

Team leaders successfully acknowledged complexities and supported early collaborative input by the CMc. Peer reviews and partnering sessions identified planning strategies and tactics beyond those anticipated by project leaders. The 15% Peer Review report suggested process improvements, and these were implemented around the time of the 50% Peer Review (see also *Effective Communication*).

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

LOGISTICAL & PROCESS TACTICS

The McNamara core team succeeded in acknowledging and addressing process issues, such as weak links, during review processes. Processes such as change orders, testing, inspections and punch lists adapted over the course of the project to formalize duration and the parties responsible for each step and task. The Request for Information (RFI) process was made less formal as it relied on direct communication and site walks to collaboratively review conditions requiring clarification.

The CMC was responsible for implementing what the team called “submittal parties”, a key tactic used to expedite submittal review and approval. The most intense decision was a four-day Mechanical, Electrical and Plumbing (MEP) “submittal party.” In general, this strategy was successful at completing submittal reviews, but some team members felt that it increased risk by forcing decisions to be made too early. Several members of the core team felt a balance could be achieved by extending the length of the meetings. Decompressing the meeting schedule would allow for more independent and focused review time between meetings (see also *Quality and Efficient Decision Making*).

While critical processes, such as change order, inspections, testing and punch lists, were in place early in the project, the 15% Peer Review indicated a need for improvement in their implementation and the clarification of roles. As a result of the feedback, processes were refined, roles and responsibilities were updated, and an escalation matrix was created. Improvements from these changes were noted in the 50% Peer Review (see also *Effective Communication*).

	OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

ALIGNMENT

The McNamara project team was fairly well aligned, demonstrating a sense of ownership of the project and collaborative effort to achieve goals and overcome challenges. However, a lack of clear criteria and ineffective communication caused misalignment between the project team and the primary tenant group.

Misalignment between the project delivery team and the primary tenant group was manifested in vague program requirements and ill-defined construction criteria. From the beginning, the lack of detail and definition in the tenant’s Program of Requirements (POR), originally developed for new construction, caused problems for the design team: “The POR we’re working from really did not dovetail well with this project, and that created a lot of challenges, a lot of anxiety, and a lot of cost to work around things.”

During construction, this misalignment became evident in other forms, such as in the tenant group’s declaration that the work installed per manufacturer’s recommendations was deficient. Without a clear documentation of requirements, the project team could not anticipate the tenants’ reactions. The team demonstrated alignment by hosting installation guideline meetings with the tenant and CMc subcontractors to address this situation and by collaboratively developing the Construction Information Guide (CIG). The CIG mollified the tensions that were

arising by clarifying the criteria and expectations of the work. It also provided a guide for preconstruction meetings and documentation of those expectations that could be referenced later if necessary.

The team demonstrated shared ownership of the project and resiliency when they resolved difficult issues related to the fitness center in the building. A tenant requested an earlier-than-expected completion date for the fitness center, and the GSA and CMc agreed to adjust the project schedule. This required extraordinary effort from all parties to ensure that the fitness center was ready for use by the new deadline. During the course of the expedited schedule, an omission in the heating system was discovered. Team members noted they were able to quickly adapt and resolve the problem without team relationship breakdowns (see also *Mutual Trust and Respect*).

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
	Clear Objectives Equal Accountability	Effective Communication	High Moderate Low

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

MUTUAL TRUST & RESPECT

For the most part, this team exhibited positive indicators of mutual trust and respect. One team member described the team’s dynamic: “I think everyone's done a yeoman’s job in terms of stepping up and taking ownership of their piece of [the project]. It isn't that we haven't all fallen down at one time or another. We have fumbled balls, but we're not talking about ‘you did this or you did that.’ The conversation is: ‘Let's solve the problem, let's keep moving forward.’ And I think that's sort of been the mantra across the board.”

Trust and respect was evident in the team’s ability to manage the omission of the heating system at the fitness center. The omission may have resulted from having to expedite the completion of the fitness center. Notably, the team did not assign blame for the error but shared responsibility for the omission and worked together to correct it. As soon as the team identified temperature concerns in the fitness center and determined its cause, the A/E made necessary changes in the documents to incorporate heating. The GSA project team reviewed the revision and the CMc priced and installed the new system. The expedient issue resolution showed that the team members retained respectful behavior and mutual confidence in each other’s ability to fulfill obligations, without resorting to blame.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
Co-location Meeting Frequency	Clear Roles Equal Accountability		High Moderate Low

	OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES			
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

EFFECTIVE COMMUNICATION

At times during the project, ineffective communication compromised efficient decision making. Roles and responsibilities were not clearly defined to the project team, resulting in unproductive communication with poorly targeted recipients.

This team experienced communication challenges but overcame them through improved definition of roles, communication channels, and tracking processes. A common complexity inherent to working with the GSA and multiple tenant agencies is a large number of project stakeholders with similar job titles. This team reported a high volume of emails directly addressed to four to six people. Without clear lines of responsibility, these emails proved to be ineffective in tracking and resolving issues. Discussions at a partnering session (March 2012) and the 15% Peer Review (December 2011) addressed this communication breakdown and suggested several process tactics and tools, including a roles-and-responsibility matrix, a communication-distribution matrix, an escalation matrix, and an open-items log to track issues and assign responsibility. The core team collaborated to develop these processes and were in the final stages of refinement and strategizing how best to distribute and implement them among the broader team at the time of the 50% Peer Review in July 2012.

The team has since reported improvements in communication and definition of roles as a result of these processes. Shortening the delay between the first identification of these problems and implementation of processes could have improved overall project communication.

The team followed the communication plan and increased direct and informal communication. Instead of relying heavily on emails or RFIs, the team members began calling or meeting face to face to initiate queries. This helped streamline communication: direct communication reduced inefficient back-and-forth written correspondences and helped the relevant team members more quickly identify and accurately communicate the issue. Direct interaction also helped build informal, trusting relationships, so that digital communication was used as a decision-tracking tool rather than a practice to protect oneself from legal penalties, criticism, or other punitive measures.

LOGISTICAL & PROCESS TACTICS

- Focused Meetings
- Right People
- Technological Tools
- Co-location

LEADERSHIP STRATEGIES

- Clear Roles
- Equal Accountability

TEAM OUTCOMES

- Alignment & Trust

DEGREE OF IMPLEMENTATION

- High
- Moderate
- Low

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

RISK MANAGEMENT

This team identified and addressed several risks early. Primarily attributable to the involvement of the CMc during preconstruction, complexities were acknowledged and strategies were developed that minimized the risk to the project.

After the ceiling was opened, the team modeled the as-built condition using BIM, allowing them to explore the systems and determine which could be moved and which needed to be navigated around. The team felt “it would have been very challenging to not do the project in 3D.”

Early CMc involvement helped mitigate budget and logistical risks. The CMc review indicated that an early design concept was too expensive to construct and led to a redesign. Early CMc involvement also allowed the team to address tenant relocation and construction phasing. An entire series of documents were developed to work out the logistics of moving the multiple tenant groups during construction, each tenant had different requirements: some could be relocated to temporary swing space while others needed their final space completed before relocation. Even with planning, this was a challenging and complicated process, but the team believed that without the planning effort, the logistics “would have crippled the project.”

BIM played a crucial role in managing technical design complexity and resolving conflicts prior to construction. The floor-to-floor dimensions of the existing building were extremely tight with many unknowns, leaving very limited space for above-ceiling systems. In particular, the twenty-sixth floor was densely partitioned and populated with many MEP systems. BIM was especially helpful in facilitating an immense coordination effort by the team.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
BIM	Preparing for complexity Process Planning Quality & Reliable Information	Alignment and Trust	High Moderate Low



- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

QUALITY & EFFICIENT DECISION MAKING

The team put in place several strategies to facilitate decision making. Fast-tracked submittal review and approval were required for the CMc to purchase certain items to meet ARRA outlay goals. To accomplish this, the team created a device they called “submittal parties”. In one instance an intensive Mechanical, Electrical and Plumbing (MEP) four-day workshop was held to approve or approve-as-noted all MEP submittals. The team assembled all the experts (trades, vendors, architects, contractors, and owner) in one place to quickly work through information. If the architect rejected a submittal or had questions, the vendor could locate the requested information and return the same day or by the end of the week with a response to the concern.

For the most part, the team felt this strategy was effective. However, the quality of decisions was jeopardized due to the speed with which decisions needed to be made. The architect felt that this type of workshop was ideal for issues regarding equipment items with long lead times but was skeptical about its value for smaller items that might not be identified until later in the project. For example, the team was unaware of, at the time of submittal party, some tenant security requirements that would affect hardware specifications later on.

Furthermore, the workshop format may be better suited for new construction. The complexities and coordination required for a renovation might be better addressed with a longer review period to allow time to work through coordination issues. The architect suggested a format for renovation projects that would employ the submittal party tactics (getting the right expertise available) but would spread approvals out over multiple sessions rather than a contiguous four-day period.

Ineffective communication, at times, posed a challenge to quality and efficient decision making (see also *Effective Communication*). Decisions should be based on quality information, but team members were unclear about the party responsible for certain tasks. This initially made it difficult to get answers and information needed to make decisions. But improved definition of roles, responsibilities, and processes, as well as increased direct communication (phone calls, face-to-face job-site meetings), helped improve the speed and fluidity of quality information and ultimately improved the decision-making process.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
Focused Meetings	Clear Objectives	Effective Communication	High
Right People	Clear Roles		Moderate
Technological Tools	Process Planning		Low
Co-location			

OVERVIEW

At a Glance

Context

Timelines

KEY INGREDIENTS

Leadership Strategies

Logistical & Process Tactics

TEAM OUTCOMES

COLLABORATION

Alignment

Mutual Trust & Respect

TEAM PERFORMANCE

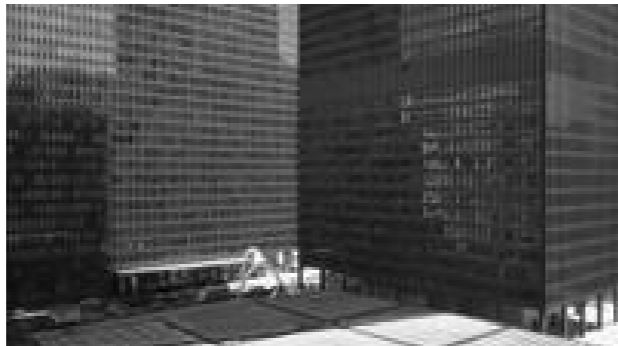
Effective Communication

Risk Management

Quality & Efficient Decision Making

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

AT A GLANCE



LOCATION

230 South Dearborn Street, Chicago, IL

BUILT

1975

PROJECT START

March 31, 2009; Notice to Proceed July 24, 2010

ESTIMATED COMPLETION

Substantial completion August 29, 2012

TOTAL PROJECT COST

\$99.7M (as of August 2012)

SIZE

1.2M GSF

PROJECT OVERVIEW

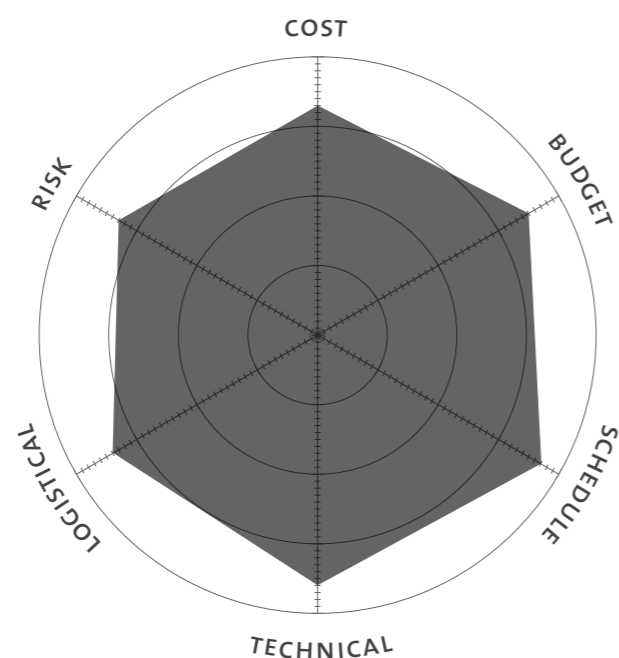
The forty-two-story John C. Kluczynski Federal Building is the tallest of the three Chicago Federal Center complex buildings. It has a total of 1.2 million gross square feet of space, rises 562 feet above grade, and contains two basements below grade. The Kluczynski building is elevated on open colonnades (pilotis) at the plaza level. To its northwest is the freestanding Loop Station post office, which is one story and has two workroom levels below grade.

Source of *text* from the project description on the GSA website.

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	COLLABORATION		TEAM PERFORMANCE		
					Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

CONTEXT



Cost Complexity: Market conditions were favorable for owner buyout of labor and materials.

Budget Complexity: The GSA used an Estimated Cost of Work rather than the more commonly used Guaranteed Maximum Price (GMP) methodology. This procurement method has advantages, but it also added to budgeting complexity. Revised pricing based on later information was higher than initial cost estimates, which necessitated modification to the work and additional ARRA funding to achieve the desired scope.

Schedule Complexity: Design experienced schedule pressure to achieve the obligation deadline and ARRA outlay goals. Although the construction schedule was reduced from four to two years early on due to budgetary considerations, the construction schedule experienced less pressure than the design phase. However, unforeseen conditions impacted the construction schedule and required major rephasing.

Technical Complexity: Large-scale systems upgrades were challenging, especially as the building was occupied and operational. Additionally, asbestos containing materials (ACM) were discovered and required abatement.

Logistical Complexity: The JCK housed between twelve and sixteen tenant agencies, all of which remained in the building during construction, making logistics highly complex. Construction took place in both day and night shifts to minimize the impact on tenants. In addition, several tenants had unique security-clearance requirements above standard GSA clearances required for work in a federal building, complicating construction coordination and phasing.

Site access was also extremely complex: another project in progress on the same site (the Plaza Project), which was located in a congested urban area. As a result, most deliveries had to be made at night. Tenant-security requirements applied to truck drivers as well, requiring additional clearances and special license plates.

Risk (Uncertainty): GSA projects are often higher in complexity due to a large number of participants, stakeholders, and tenants. This project had a large number of tenants to coordinate, and the visible location, with GSA headquarters located within the Kluczynski building, increased the involvement of non-core-team GSA stakeholders. Too many opinions and a high-volume of external input increased transactional risk. Additionally, unforeseen conditions in mechanical systems raised risk.

OVERVIEW

At a Glance

Context

Timelines

KEY INGREDIENTS

Leadership Strategies

Logistical & Process Tactics

TEAM OUTCOMES

COLLABORATION

Alignment

Mutual Trust & Respect

TEAM PERFORMANCE

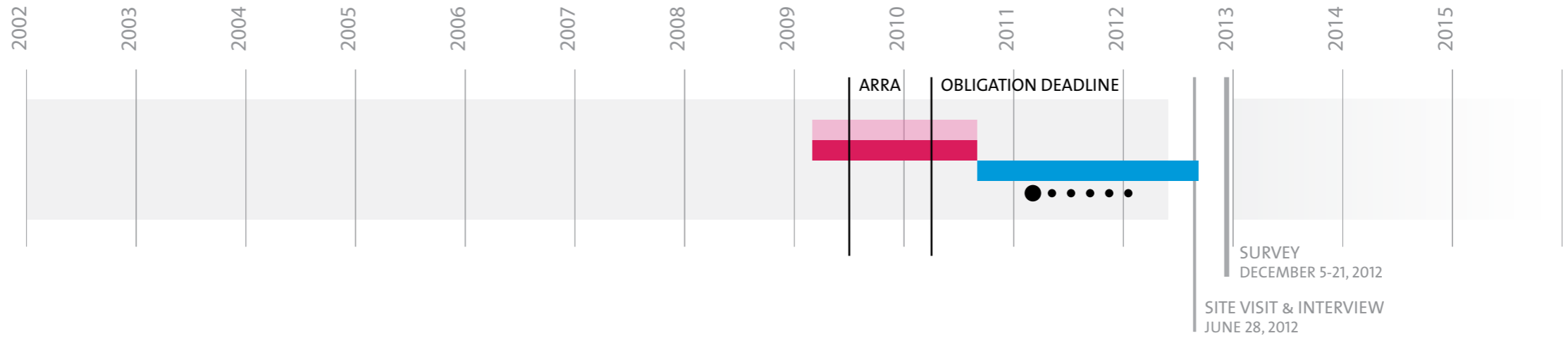
Effective Communication

Risk Management

Quality & Efficient Decision Making

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

TIMELINES



Some piecemeal studies had been done prior to the ARRA but very little previous design work. The A/E team was asked to re-evaluate the feasibility of the previous studies. The previous piecemeal scopes essentially became the scope packages, with a few additions, such as restrooms and core work, for the JCK ARRA renovation. The scope packages were not consolidated into a holistic project as in some other projects, however because no previous design had been done, packages were designed from the start of the ARRA, with input from the CMc.

- PLANNING
- DESIGN
- CONSTRUCTION
- TURNOVER (LARGE IMPACT)
- TURNOVER (MEDIUM IMPACT)
- TURNOVER (SMALL IMPACT)

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

LEADERSHIP STRATEGIES

Specific leadership strategies were not overtly evident in the interview or survey, indicating a less prominent role of the project leaders on this project than others. During design much of the project orchestration appeared to be driven by the A/E; during the delivery process, the close proximity of team members appeared to be the primary factor supporting collaboration and communication. It was not clear if the neutral role of GSA leadership was intentional or if there was no perceived need for strong leadership due to a more distributed and collaborative leadership model.

Multiple comments indicated this team had a strong preference for grassroots leadership over top-down external leadership. Early in the project, a group of executives from the GSA, the A/E, and the CMc (who collectively referred to themselves as Emergency Project Leaders) met regularly to review collaborative practices and resolve issues. Comments by team members in the interview and survey indicate skepticism regarding the effectiveness of this top-down effort. As one team member noted, “They [the executives] talk, but they don't necessarily implement things to make it more collaborative. Collaborative nature is self generated, I don't think that comes down from the top as much.” The team did not embrace other outside efforts, such as the CMc Summit, intended to encourage collaboration and generate processes to deal with the unique ARRA context. The team indicated that ideas arising from that meeting were not implemented.

Although executive-level meetings were valuable to other teams (e.g., Whipple), it appeared that the JCK team responded to strategies and tactics generated by core-team leaders directly involved with the project rather than those introduced by centralized or executive-level leaders. During the course of the project, collaborative relationships among the core team evolved through close proximity and frequent face-to-face interaction. While this team managed to be relatively successful without global-scale strategies on day-to-day tasks, larger goals could have benefited from more external strategies.

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

LOGISTICAL & PROCESS TACTICS

Meetings were held very frequently during this project and were the primary mode of communication, supplemented by email, phone calls, and face-to-face interaction. During design the A/E team facilitated weekly “onboard design reviews” to fast-track design decisions. While this tactic was effective, a negative effect may have been the limitation of stakeholder input. “Submittal parties” were used on this project for issues that required quick resolution. “Coordination parties” occurred after demolition so that MEP coordination would have access to high-quality information based on actual field conditions.

The frequency of meetings limited work time, requiring the team to extend their hours past the typical working day. One survey comment expressed the frustration, indicating that there were “too many meeting questioning what was already clear in the drawings and specifications.” It should be noted that some meetings may have felt redundant to A/E team members, but not to the CMc or other parties less familiar with the documents.

Co-location was an effective logistical tactic for this team because everyone was available for meetings as issues arose. As voiced in one survey response, “walking spaces with the owner, A/E, and CMc was the best way to facilitate resolutions.”

	OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

ALIGNMENT

For the most part, the core JCK team appeared to be aligned in terms of project goals and priorities. The proximity of team members and frequent face-to-face meetings were the most significant contributing factors to team alignment. Some misalignment occurred between the project team and building stakeholders (property management and tenants) because of divergent priorities and a lack of effective communication. It should be noted that reliable communication was particularly difficult given the number and frequency of unforeseen conditions during construction.

During the design phase, the team successfully integrated efforts to issue design packages to meet ARRA goals. Core-team members attributed this success to the effective communication of ARRA goals and project priorities by the project leaders, who primarily focused on Leadership in Energy and Environmental Design (LEED) points as most ARRA Minimum Performance Criteria (MPC) were deemed not applicable within the scope of the project. Driven by the A/E firm’s needs expressed during design, the facilitated weekly meetings effectively communicated project issues and priorities. Frequent meetings kept the team engaged and in tune with the project (see also *Effective Communication* and *Quality and Efficient Decision Making*).

As most ARRA teams indicated, aligning priorities between the project team and property-management team was at times challenging and required great effort. The extensive scope of the project coupled with the need to keep the building operational meant that tenant inconvenience could not be avoided. The project team struggled with effectively communicating activities, the impacts of construction, and several unforeseen deficiencies in the existing building to the many tenant organizations. Communication was a complex challenge because each tenant-group representative relayed project information to the tenants differently. The team speculated that tenants were not always fully informed, and tenant complaints were submitted throughout construction. Additionally, the team noted that disagreements arose regarding the parties responsible for addressing pre-existing but previously unidentified deficiencies.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
	Clear Objectives Equal Accountability	Effective Communication	High Moderate Low

	OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES			
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK**
- Peck

MUTUAL TRUST & RESPECT

Trust and respect is built over time as relationships develop. In this case, close proximity and frequent face-to-face meetings starting early in the project helped build those relationships. In large part, the JCK team appeared to be a close team demonstrating professional respect.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
Co-location Meeting Frequency	Clear Roles Equal Accountability		High Moderate Low

	OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES			
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

EFFECTIVE COMMUNICATION

This team relied on meeting frequency and facilitation for effective communication: “We meet an awful lot. So the most effective communication strategy is that we're always together.”

The high frequency of meetings was facilitated by the project location (GSA headquarters): “If we were farther apart we probably wouldn't meet as often.” The majority of team members, namely GSA and the CMc, were co-located on-site, the A/E offices were close to the job site: “The proximity is nice because we can take care of the important issues face-to-face.” Key team members interacted formally during meetings and informally between meetings, ensuring that the right people connected to resolve issues quickly. Face-to-face time also helps build trust and respect among team members, leading to camaraderie that is open and straightforward.

Frequent meetings are most effective when coupled with strategies to promote quality information sharing. During design this team achieved this with weekly “onboard design reviews.” Preparing for the meetings helped “assist all of us in knowing who to bring to the meeting and when.” Each week an agenda was distributed several days prior to the meeting, identifying topics and who needed to be present. A similar strategy was used during construction for “submittal parties.” This leadership tactic ensured project participants were clear about priorities and could prepare quality information. Efficiency was achieved because people

could attend the meetings relevant to them, and having the right experts prepared to engage increased the reliability of information.

Although communication between team members was effective, the team struggled to communicate effectively with tenant groups. With the large number of tenants, size of the project, and numbers of unforeseen conditions, JCK experienced some of the most challenging tenant logistics of any of the ARRA projects studied in depth. The CMc was a dedicated tenant coordinator responsible for communicating construction-activity scope and schedule impacts to tenants. In spite of best efforts, communication faltered and alignment of tenant goals and team goals was difficult to achieve. The coordinator held outreach sessions, but attendance was low. Fact sheets were distributed to liaisons within each tenant group, but because some liaisons were not local, the team was not confident that the information was shared effectively to the tenants. Additional staff resources dedicated to these efforts may have improved communication and increased buy-in from building stakeholders. The team specifically noted that a lack of a CMA negatively impacted tenant communications. Given the highly complex nature of JCK tenant and facility logistics, having a dedicated facility manager, someone who is already known and trusted by building stakeholders, to coordinate with the project team and help manage relationships between building stakeholders (see also *Whipple, Effective Communication*) may have helped.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
Focused Meetings Right People Technological Tools Co-location	Clear Roles Equal Accountability	Alignment & Trust	High Moderate Low

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

RISK MANAGEMENT

All ARRA projects faced complexity; however, maintaining a fully operating high-rise building in downtown Chicago, with more than fourteen different federal agencies, made this project especially complicated. As one project member described it: “It was heart surgery with the patient awake and moving. We gutted the entire HVAC system in an occupied building while it continued to function.” Other challenges included an initial construction estimate \$45M over budget, unforeseen asbestos containing materials (ACM), and other unexpected conditions in the mechanical systems of the core package. All of these factors contributed significant risk to the project, but for the most part the team did a good job acknowledging the complexities and putting processes in place to overcome these challenges. These processes were less effective in addressing unanticipated conditions.

The fast-tracked design schedule was a risk in all ARRA projects. Because the A/E had experience working with the GSA, they knew that the standard review and decision-making process would not allow them to meet the ARRA obligation deadline. Acknowledging this challenge, A/E leaders developed a process to expedite design decisions. Other team members noted that the “[A/E] did a good job of managing their client because they understood that, with the aggressive schedule, there had to be all these onboard reviews” (see also *Quality and Efficient Decision Making*). To overcome budget complexity, the team relied heavily

on collaboration. In September 2009, the GSA put out a narrative of the project scope and requested competing CMcs provide an Estimated Cost of Work (ECW) with major cost components broken out. From that process, the CMC was selected and the ECW was contractually set at \$75M. Once the CMC was brought on in November 2009, they priced out the design development set in preparation for the regional December 2009 ARRA obligation deadline. Pricing came back at \$120M, \$45M over the ECW.

The team immediately recognized this challenge, and resources and processes were shifted to solve this issue. The first collaborative budget effort by the team was a “week and a half long marathon” series of working meetings focused on schedule and scope. Project phasing was completely revised to reduce the project duration from four to two years, greatly reducing costs attributed to general conditions. Later unforeseen conditions extended the schedule for some packages, but substantial completion was achieved within the two-year schedule. Market prices for materials at that time were unpredictable, and there was a chance prices would decline. As the team worked toward establishing the GMP, the team minimized risk to scope by developing a Scope Alternative Matrix (SAM) to guide their decisions from the design development phase to the bid documents. Comments from the team show SAM to be a powerful tool: “We generated all these options that would be incorporated into this bid set of drawings so that once we got the real feedback from the market we could pick and choose the options to either move us up or move us down to

hit our \$75M.” The SAM, an Excel document, was passed back and forth between the A/E and CMC, with frequent conversations based on design and cost evaluations. Using this document, the team felt confident committing funds, knowing that they could reduce future scope as needed.

In building renovation, unforeseen conditions pose risk. Asbestos containing material (ACM) discovered during replacement of the air-handling units created the largest negative impact from an unforeseen condition. Since the building was occupied, there was a limited window for shutting down the systems. Remediation of ACM invalidated the schedule and required storage space for the preordered air-handling units. Developing remediation processes took more than four months to resolve. The team overcame the challenge, but the schedule was permanently affected.

In spite of this major setback, the team avoided risks attributable to other unforeseen conditions by evaluating actual conditions prior to construction. Each time a section of ceiling was opened, the A/E firm surveyed and drew exact conditions. These drawings were used during interdisciplinary “coordination parties” with the A/E, CMC, and trade contractors. Building Information Modeling (BIM) was not used, but the anticipation of issues prior to construction, a known benefit of BIM, helped this team work effectively (see also *Quality and Efficient Decision Making*).

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
BIM	Preparing for complexity Process Planning Quality & Reliable Information	Alignment and Trust	High Moderate Low

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

QUALITY & EFFICIENT DECISION MAKING

Team members differed in their perception of the timeliness of decisions. Those with previous GSA experience felt the decision-making process was much faster than on other GSA projects; others felt the decision making caused delays. This reflected the pressures choosing between the “right decision [and] the quick one.” In some cases, decisions were delayed to gather additional information. Overall, the team was able to meet the aggressive design schedule by implementing meeting strategies that promoted efficiency. Meetings, such as “onboard design reviews”, “submittal parties”, and “coordination parties”, supported collaborative input of expertise and expedited decision making. While these strategies increased efficiency of decisions, feedback on the questionnaire indicated that some stakeholders felt their concerns were sometimes trumped in the interest of project speed.

Early on, project leaders acknowledged that typical GSA strategies had to be improved in order for the fast-paced design schedule to meet ARRA obligation deadlines. The team developed “onboard design reviews,” the format of which supported collaborative input from designers, engineers, GSA subject experts, and GSA stakeholders for project decision makers to consider. These meetings, led by the A/E firm, were held weekly on the job site. Success was dependent on the consistent preparation by the meeting orchestrators. Agendas were distributed several days prior to the meeting so that the attendees could prepare and the right people could

be assembled. During the meetings, the A/E team limited topics to priority issues, for which they would bring several possible resolutions for review. Decisions were thoroughly documented in meeting minutes and distributed to the team. These were well-facilitated meetings marked by effective communication of reliable information. The right people were empowered to commit to decisions, and the project continued to move forward.

Budget complexities, unforeseen conditions, and late scope additions by the GSA delayed some decisions and in some cases slowed down some phases of construction. For the most part the team remained effective, but the schedule was negatively impacted.

Standard workflow items, such as submittal reviews and coordination during construction, were effectively facilitated and efficient because of availability of the GSA core team and the implementation by the team of two meeting processes, “coordination parties” and “submittal parties.” Occurring frequently during the early stages of construction and continuing throughout the delivery process, these meetings coordinated field knowledge with trade and industry experts to provide quality and reliable information to project decision makers.

The use of “coordination parties” and “submittal parties” evolved over the course of the project, reaching an optimal sequence described as follows: demolition of ceilings or restrooms occurred in work areas, the A/E team surveyed

areas and drew existing conditions, and mechanical trades overlaid their work on drawings of existing conditions. Coordination parties would gather the larger team to review and revise coordinated documents, circumventing a lengthy revision and resubmittal process. Similar to processes used on other projects, submittal parties were held throughout the delivery process and made trade and industry experts available to reviewers, so that questions and concerns could be immediately addressed and approvals could be given more quickly than with traditional processes.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
Focused Meetings Right People Technological Tools Co-location	Clear Objectives Clear Roles Process Planning	Effective Communication	High Moderate Low

OVERVIEW

At a Glance

Context

Timelines

KEY INGREDIENTS

Leadership Strategies

Logistical & Process Tactics

TEAM OUTCOMES

COLLABORATION

Alignment

Mutual Trust & Respect

TEAM PERFORMANCE

Effective Communication

Risk Management

Quality & Efficient Decision Making

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

AT A GLANCE



PROJECT OVERVIEW

The current overall purpose of the project is to upgrade and modernize the John W. Peck Federal Building. The scope of work includes: clean and tuck-point exterior limestone and install new windows, a new roof, a new fire-alarm system, a fire-sprinkler system, and a fire pump. Other upgrades include ceiling and lighting, and a mechanical system with new air-handling units.

Source of *text* from the project description on the GSA website

LOCATION

550 Main Street, Cincinnati, OH

BUILT

1964

PROJECT START

-

ESTIMATED COMPLETION

June 2014

TOTAL PROJECT COST

\$46.9M (as of August 2012)

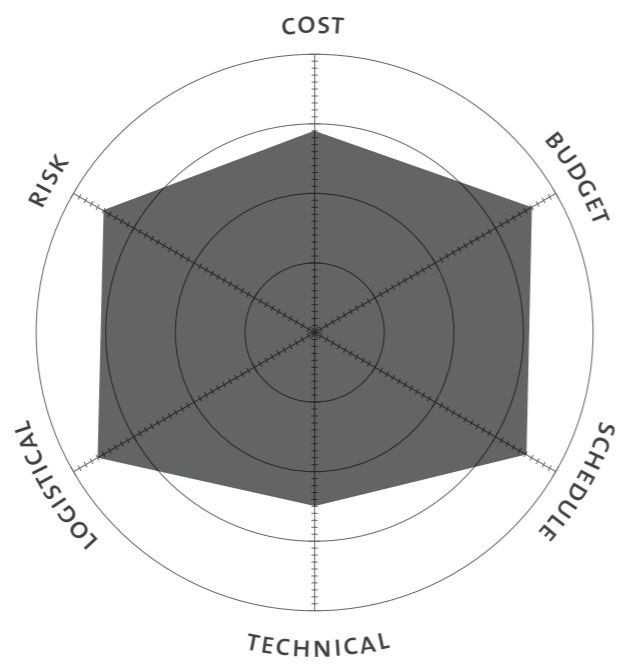
SIZE

-

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

CONTEXT



Cost Complexity: Market conditions were favorable for owner for buyout of labor and materials. Typically, a highly competitive market leads to bids with very small margins; these low margins sometimes contribute to later budget challenges as projects evolve.

Budget Complexity: This project faced similar funding complexities that other ARRA projects did. However, in addition to those pressures, this project’s budget was reduced over the course of several spend-plan reviews, because the reviews revealed that the team and its leaders were not able to articulate project priorities. Interviews highlighted the team’s confusion in understanding the GSA spend-plan criteria, deadlines, and methodology for budget decisions. Without a clear set of project priorities and a lack of comprehension about the review context, the team and its leaders were unable to make effective arguments for retaining or expanding the budget and also unable to improve their arguments during later reviews.

A major unforeseen condition resulted from the newly established Environmental Protection Agency (EPA) Polychlorinated Biphenyls (PCBs) regulations. It was discovered that the window caulk on the Peck building contains PCBs, leading to two suspensions-of-work notices, budget shortfalls, and the need to reduce the scope of other areas of the project. The low contingency percentage magnified problems caused by the unforeseen conditions.

Schedule Complexity: This project faced similar pressure to fast-track the design as other ARRA projects. However, with a lack of clarity and limited collaboration, the team was slow or, at times, unable to respond to those pressures.

Technical Complexity: This project faced similar complexity as other ARRA renovations, in which new systems were being tied into existing and operating building systems.

Logistical Complexity: All twenty-two tenant agencies remained in the building during construction. Most tenants were not relocated to a swing space—almost all construction work was done after hours. This significantly complicated the construction logistics and coordination. Furthermore, several tenants required a high level of security requiring security-guard supervision during construction for after-hours work in their offices.

Risk (Uncertainty): GSA projects are often higher in transactional complexity due to a large number of participants, stakeholders, and tenants. Risks were not well identified at the start, and higher than average project-personnel turnover exacerbated transactional complexity and overall project risk.

OVERVIEW

At a Glance

Context

Timelines

KEY INGREDIENTS

Leadership Strategies

Logistical & Process Tactics

TEAM OUTCOMES

COLLABORATION

Alignment

Mutual Trust & Respect

TEAM PERFORMANCE

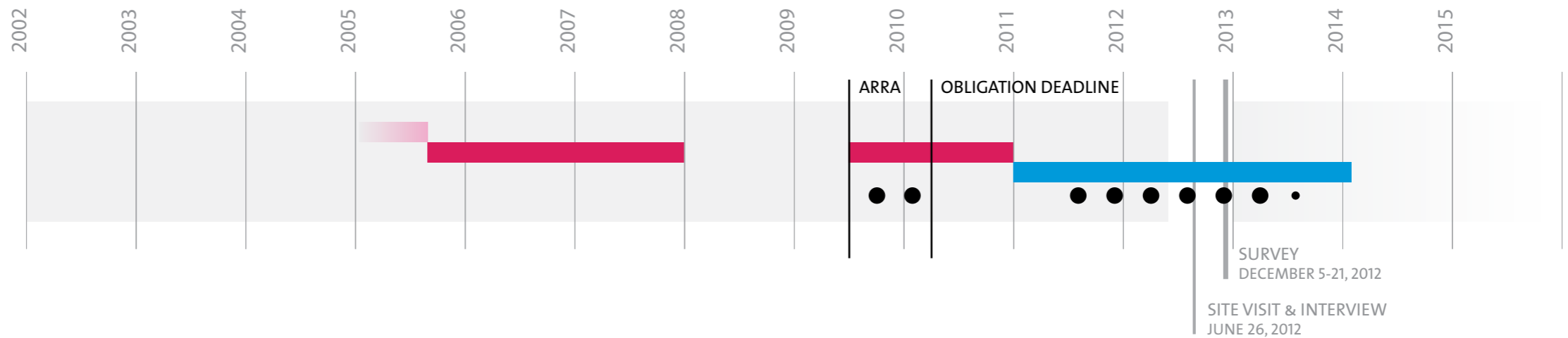
Effective Communication

Risk Management

Quality & Efficient Decision Making

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

TIMELINES



The project design was highly developed well before the ARRA. When ARRA requirements were announced, the team based their work on the previous design and tried to modify the existing design to meet the new criteria. Little time was spent looking at the project from a global perspective to determine if modifying the design was the best option. Hindsight indicates that either starting with a completely new design or making minimal modifications may have been more successful.

Frequent personnel turnover, due to performance issues during design, caused gaps in knowledge. Project goals, decision-making criteria, and team-member roles and responsibilities were very unclear which complicated the design process and hindered collaboration. During the life of the project, there have been four different GSA project managers, three contracting officers, three contracting-officer representatives; and the CMC has had two different project managers and five superintendents.

This lack of continuity added risk, with the additional time needed to update new leaders and for them to form relationships with the team. Inevitably, information and project history was lost with each handoff.

- PLANNING
- DESIGN
- CONSTRUCTION
- TURNOVER (LARGE IMPACT)
- TURNOVER (MEDIUM IMPACT)
- TURNOVER (SMALL IMPACT)

	OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

LEADERSHIP STRATEGIES

Leadership on the Peck project was severely deficient as indicated in the 15% Peer Review: “the Project Delivery Team clearly does not have a single definitive project (go-to) champion who steps forward to help identify key issues, address challenges, or facilitate resolutions.” Questionnaire comments indicated that leaders failed to create processes to overcome complexity, communicate clear project objectives, and hold project participants accountable. Overall, the criticism was that leaders had “no holistic approach to management.” Frequent leadership changes and a low degree of co-location (due to the distance from the home offices of contracted parties to the job site and nighttime construction schedule) likely contributed to the leadership shortcomings.

To align the team and establish criteria for decision making, it is critical for project leaders to communicate project objectives, especially as these goals change. As one Peck-survey comment indicated, the “GSA management altered their objectives during [design], leaving the team with changing project objectives.” Many ARRA projects experienced similar frustrations. The project leaders with strong communication skills were able to overcome this challenge by clearly articulating the context and rationale for change.

The creation of a collaborative culture marked by alignment as well as trust, and respect largely occurs with leaders who hold all parties equally accountable. As a survey comment indicated, Peck leaders failed to support a collaborative culture because they did not hold “all parties equally accountable [which] created resentment amongst team members, both towards each other and towards [leadership].” A lack of collaborative culture significantly increased transactional risk for this team and negatively impacted team performance, subsequently adding risk to other aspects of the project.

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

LOGISTICAL & PROCESS TACTICS

Data from this team indicated that the team was unsuccessful in developing and implementing logistical and process tactics. Although meetings were relatively frequent, they were not effective. Extensive and time-consuming meeting and email documentation appeared to be primarily motivated by a lack of trust and only secondarily by a desire to communicate information. Without trust and respect, documentation is not an effective form of communication. The lack of communication, alignment, and collaborative team culture made the implementation of process-management tactics difficult, and the team struggled to work together.

The 15% Peer Review indicated that the most significant challenges to team collaboration can be linked to the project leadership that failed to define and communicate a framework for teamwork. Other process-improvement suggestions focused primarily on the clarification of roles, explanation of project objectives, and alignment of expectations to improve the quality and efficiency of design making. The report suggested that the team collaboratively create a shared Statement of Work that identifies the responsible project-team member and defines each partner's scope of work.

Peers also recommended that the team define a “decision-making framework, reinforce the review and approval process,” and visually map these protocols to distribute and post in the project workspace. The 50% Peer Review indicated that leadership changes improved relationships, but roles and responsibilities remained unclear among some team members. Significant budget and construction-quality challenges revealed that recommended improvements were not successfully implemented at the 50% Peer Review.

	OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

ALIGNMENT

The Peck project team struggled with alignment, evidenced by this 15% Peer Review comment: “as a whole the Project Delivery Team is not performing as a unified and integrated group with a set of common project goals and shared expectations.” Noted difficulties to alignment included frequent changes in GSA leadership, unclear goals and objectives, and low degree of co-location.

From the first introduction of the ARRA, there was confusion among the project team as to how the ARRA would affect the project. The communication of project objectives and decision-making criteria is the responsibility of GSA leadership; a lack of clarity in these areas caused challenges to team alignment. GSA leadership's ability to achieve this may have been difficult due to frequent GSA personnel turnover: this project has had four GSA project managers since its inception through the time of this study. For example, the ARRA added high-performance goals (in the form of the Minimum Performance Checklist), which were emailed to the team with little discussion of its implications to the work of the architect and the CMc. The architect took on the responsibility for evaluating the feasibility of the new criteria and integrating it into the already well-developed design. The project team commented that the revision of the existing design to incorporate the ARRA’s scope was done without a target budget, which further complicated matters, and that the architect produced design documents without

this information. The revised documents priced over budget, and the project struggled with budget issues for the remainder of the delivery.

Another instance of misalignment of goals could be seen between the project team and the on-site facilities team. The project team was concerned with designing and delivering the project, while the facility-management team was concerned with tenant satisfaction. Since the majority of the design changes resulted in benefits to systems and exterior facade not visible to the tenants, they only experienced the disruption and were reluctant to cooperate and engage. The physical distance between the project site and the GSA project management compounded project team and facilities team misalignment. The GSA project management based in Chicago had limited site time in Cincinnati, typically once per week. Without frequent GSA project leadership presence on-site, and no one assigned to manage the interface with the facility managers or tenants on a regular basis, the local facility-management team wielded a great deal of control over the project. Facility-management decisions were not always reliable: for example, approvals for contractors to enter tenant spaces were sometimes rescinded, delaying the scheduled construction.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
	Clear Objectives Equal Accountability	Effective Communication	High Moderate Low



- ARRA Project Cumulative
- Whipple
- State Street South
- McNamara
- JCK
- Peck

MUTUAL TRUST & RESPECT

This team reported strained relationships and a lack of trust and respect, although relationships appeared to improve toward the end of the project as a result of changes in leadership and other personnel. Indications of lack of trust include extensive email documentation of all discussions and commitments, reports that meetings were not always cordial (at times meetings resulted in raised voices and accusatory language), and partnering sessions specifically focused on relationship and behavior challenges.

Early trust difficulties arose and remained unresolved under project leadership that failed to unify the team to surmount the challenges. Most notably, misalignment of budget expectations early in the process caused significant problems throughout the delivery process. In 2005 the architect designed the Peck renovation to a budget of \$35M. In 2007 the project was placed on hold; in 2009 the GSA decided to move forward with the project, and documents were put out to bid in a highly competitive market. Under these conditions, the CMC's estimated project cost was \$20M. When the ARRA was introduced, the GSA believed the \$15M differential between the original budget and the CMC estimate would be sufficient to achieve the additional high-performance scope.

However, during the revision of design documents, barriers to collaboration arose. This project's design development was at a relatively advanced state

prior to the time of the ARRA, so the CMC's input was understandably limited since many design decisions had already been finalized. Team members commented that many worked as independent entities with the information they felt was correct, without integrating their efforts. The revised design exceeded the expected budget of \$35M, and the design had to be reduced in scope. Team members expressed frustration with the revision process, perceiving previous revisions as wasted efforts. These impressions may have contributed to the low trust and respect ratings from the team.

In spite of a team-building session prior to the first peer review (15% Peer Review) the reviewers noted persistent relationship problems. Recommendations included partnering sessions and integrated team meetings to work on team relationships. Also suggested were collaboratively developed documents to clarify project objectives, team-member roles, and process-management strategies (flow of information, decision making, review processes, etc.). However, the team struggled to implement process recommendations. Two additional partnering sessions were held, but the facilitated sessions were not able to significantly repair the lost trust and respect among team members.

Personnel changes in project leadership appeared to improve relationships, but the team members continued to struggle with process improvements. Meanwhile, budget challenges and unforeseen complexities (such as the

PCB-abatement regulation) required significant reduction of scope and contributed to an environment that was not conducive to repairing trust among team members.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
Co-location	Clear Roles		High
Meeting Frequency	Equal Accountability		Moderate
			Low

	OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES			
	At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

EFFECTIVE COMMUNICATION

Numerous factors contributed to communication challenges for the Peck team throughout the project delivery. Lacking alignment as well as trust, and respect, the team was not able to effectively use primary communication and information tools.

Meetings, usually a critical communication and information-sharing mechanism, at times devolved into emotionally charged arguments between team members who did not exhibit the open, straightforward markers of effective communication. Effective meetings require identification of the appropriate participants and clear goals and objectives. Ineffective meetings often result in unreliable information, slow decision making and decisions that are later reversed.

Direct, face-to-face communication was not common practice for the Peck team, partly due to the lack of opportunity and partly due to the lack of trust and respect. Logistical factors, such as distance from the GSA project-management base and the night-construction schedule, severely limited face-to-face meeting time. The primary mode of communication was email, even between team members located on-site (the CMc and CMa). The most common reason cited for the heavy reliance on email was to ensure the full documentation of conversations—evidence of the lack of trust and respect.

LOGISTICAL & PROCESS TACTICS

- Focused Meetings
- Right People
- Technological Tools
- Co-location

LEADERSHIP STRATEGIES

- Clear Roles
- Equal Accountability

TEAM OUTCOMES

- Alignment & Trust

DEGREE OF IMPLEMENTATION

- High
- Moderate
- Low

OVERVIEW			KEY INGREDIENTS		TEAM OUTCOMES				
					COLLABORATION		TEAM PERFORMANCE		
At a Glance	Context	Timelines	Leadership Strategies	Logistical & Process Tactics	Alignment	Mutual Trust & Respect	Effective Communication	Risk Management	Quality & Efficient Decision Making

ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

RISK MANAGEMENT

This project had a long history prior to the ARRA. Among ARRA projects, its design was considered most developed, or “shovel ready.” The high level of development turned out to be a disadvantage: the advanced stage of the project contributed to risk and complexity in several ways. A low bid by the CMc on the original scope set up unrealistic budget expectations. The ARRA changes were considered distinct from the original scope and treated as a separate contract, creating confusing contractual boundaries. The ARRA’s high-performance requirements posed technical challenges: generally high-performance design is most effectively addressed at the beginning of a design process, and the modification of a design not originally conceived with those parameters in mind proved challenging. The decision to keep the tenants in place and to work at night also added to the construction and coordination complexity. Struggling to meet these challenges, the project team requested additional funding and cut scope at various intervals throughout the delivery process.

Risk factors were not identified early in this project. While it is impossible to know exactly why risks were overlooked, it may have resulted from the significant time gap between original design and ARRA funding, as well as frequent leadership changes, inexperienced leadership, and limited contribution of expertise early in the project.

Peck project leaders did not fully prepare the team for the project complexities early in the project. Strategies such as early interdisciplinary meetings or collaborative process-planning discussions did not occur, and there was little communication and no decision-making mechanism established at the start of the project. This added transactional risk to the project and limited the opportunity for proactive risk identification throughout the project.

Another frustration for the architects was the timing of the ARRA sustainability criteria, issued after the high-performance goals were defined and in this case late in the design process. Instead of an integrated design, they were forced to essentially perform a feasibility study for high-performance technologies after the design was complete. In hindsight, the team believes two options could have helped avoid many challenges: one option would have maintained the original LEED Silver design without change, the other option would have been to abandon the original design and to replace it with a new one that met the ARRA criteria. The latter approach was successfully used in State Street and Whipple. A great deal of complexity resulted from attempting to fully integrate new criteria into an existing design while contractually separating those changes as a distinct scope.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
BIM	Preparing for complexity Process Planning Quality & Reliable Information	Alignment and Trust	High Moderate Low



ARRA Project Cumulative
Whipple
State Street South
McNamara
JCK
Peck

QUALITY & EFFICIENT DECISION MAKING

This project was crippled by many early decisions that were poorly informed, some before this team began the project. Risks were not identified early on. Additionally, several key ingredients required for quality decision making were missing: clear goals and objectives, co-location, quality and reliable information, clear roles and responsibilities, and right people to contribute expertise.

The decision to leave the tenants in place was the result of analysis done pre-ARRA. It was determined that moving tenants out of the building would be too expensive and would require complex coordination due to the unique security requirements of each organization. As it happened, keeping the tenants in place also caused hardship for the project team and likely contributed to the challenges in alignment as well as trust and respect, and effective communication. To keep tenants in place and the building operational, night shifts were implemented. On-site times for the GSA and the architect were already limited given the location of the project, and the shifting of the schedule further limited direct communication between project-team members and added complexity to construction logistics. Relationships between the tenants, facility managers, and the project team were strained, and expectations were not aligned. The team noted that even simple coordination issues, such as permission for site access, were unreliable.

Early in the project, leaders failed to implement an effective decision-making process. Often questions or issues would come up, circulate through a variety of stakeholders with divergent opinions and perspectives, and get lost in the shuffle without anyone to make the final decision. This slow decision-making process was demoralizing. Team members noted a reluctance to bring ideas or queries to the table, because they believed it would further slow progress on the project and was unlikely to result in improvement.

It was difficult for any team member to step into a decision-facilitator role, because the GSA project leaders did not clearly define the goals or criteria for making decisions. For example, the GSA project manager did not give the architect clear budget guidance for the additional ARRA requirements. This was a serious omission, hampering their ability to evaluate options and make a quality decisions. The project scope and budget suffered as a result.

Although the ARRA put pressure on teams to streamline decision-making processes in order to fast-track design and outlay project funds, the team was largely unable to implement strategies to meet these goals. For example, the team members spent months investigating options to meet ARRA outlay goals. In spite of this effort, they missed the outlay targets, and the team was not able to clearly define or communicate scope needs.

As a result of poorly defined goals and a lack of clarity on the larger GSA decision processes, proposals for scope increases were not approved. Funds were decreased in certain areas and redistributed to other teams that could justify their budget needs.

LOGISTICAL & PROCESS TACTICS	LEADERSHIP STRATEGIES	TEAM OUTCOMES	DEGREE OF IMPLEMENTATION
Focused Meetings	Clear Objectives	Effective Communication	High
Right People	Clear Roles		Moderate
Technological Tools	Process Planning		Low
Co-location			