The Integrated Design Process on Paper and In Practice: A Case Study

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The use of an integrated design process is encouraged or required by a number of green building certifications, but many design and construction professionals have very limited knowledge about how to practice integrated design. This paper compares the integrated design process as practiced on one design project in mid-sized urban center in the Midwestern United States to the process outlined in the ANSI/MTS 1.0 Whole Systems Integrated Process Guide (WSIP)-2007 for Sustainable Buildings & Communities© (WSIP Guide). The project observed for this case study included a feasibility assessment regarding achievability of three green building certifications (LEED®, Living Building Challenge and 2030 Challenge) and the development of up to three conceptual designs. The design firm hired to lead the project facilitated a firm-developed integrated design process. While the design firm included many of the practices recommended in the WSIP Guide, there were also points where the process deviated from recommended practice.

Key Words: integrated design, whole building design, sustainability, green building

Introduction

Over the last 15 years, the construction industry has seen a considerable increase in discussion around, research on, and certification of the "sustainability" or "greenness" of buildings (Kibert, 2008). As municipalities, funding bodies and consumers expand the demand for green buildings, there is much debate about how to design and build higher performing, more efficient structures, centering around everything from which delivery system is best suited to green projects to the latest selection of interior finishes. It is generally accepted that the successful design, construction and use of a high performing, economically feasible green building entails a more cooperative, more cohesive project team (Pulaski & Horman, 2005; Rohracher, 2001). To engage project partners in this cooperative practice, the USGBC's Leadership in Energy and Environmental Design green building rating system, currently the leader in the green building certification market, encourages the use of an integrated design process (IDP) on projects seeking certification. Other rating systems, including GBI's Green Globes rating system, the National Association of Homebuilders Green Building Program and The Living Building Challenge, also encourage and/or award points for an integrated design process. However, in an industry as historically fragmented as construction, there are few professionals with experience leading or working with an integrated design team – especially in smaller markets. Many teams are looking for answers to basic questions like, how the integrated design process is defined and how to put the process into practice on a given project. This paper explores both of those questions through the lens of the ANSI/MTS 1.0 Whole Systems Integrated Process Guide (WSIP)-2007 for Sustainable Buildings & Communities© (WSIP Guide) and the practice of an integrated design process in a mid-sized, Midwestern community. The WSIP Guide provides a map for conducting an integrated design process, but how closely did the practice of IDP as practiced in this case resemble the map that has been laid out on paper?

The Integrated Design Process

The integrated design process is also known as *whole building design* or *integrative design*. This type of process assumes that construction, design, and engineering specialists have distinct and complementary knowledge bases and can work together to achieve higher levels of performance, simplify construction, decrease costs, and shorten the build schedule (Popcock, Kuennen, Gambatese, & Rauschkolb, 2006). These are desirable outcomes on any project, and are particularly germane for construction projects weighing cost, time, and performance concerns related to a sustainability certification as a project goal. An integrated design process endeavors to engage project stakeholders on three levels. First, stakeholders work to develop a shared vision for the structure. Second, they become able to envision the structure holistically. Finally, they commit to serving as subject matter experts at each phase of a project (Popcock, Kuennen, Gambatese, & Rauschkolb, 2006). Integrated design is not a new concept, nor is it one unique to the green building industry. The recent history of this philosophy is solidly housed in the literature related to sustainable design and construction. The process seeks to include experts from a number of disciplines, as well as building end-users, in the earliest phases of the planning and design process. Team members work together through design Charrettes and other communication channels to clarify project performance goals, owner requirements and to begin brainstorming design ideas. As the process progresses, brainstorming sessions and other forms of communication become more technical in nature with each team member contributing her/his expertise to the design of the highest performing building possible within the constraints of the project goals and objectives (Kibert, 2008).

Designers, engineers and constructors all bring distinct knowledge bases to the design process. For the last 50 years, common practice in the United States has been for the architecture firm to take sole responsibility for design, involving other specialists on the project team after the design phase is complete. In this system, any consultation happens too late for specialist knowledge to have a significant positive impact on design, materials and assembly choices (McLennan, 2004). There is little data documenting how frequently the integrated design process is used on green building projects. That professional organizations and standards bodies are creating guides suggests that there are practitioners employing IPD on individual projects or as part of general practice. The basic process includes six elements, practiced through a design process with five to seven phases. Early involvement of a diverse stakeholder group, project visioning, targeted design meetings (sometimes referred to as Charrettes), multiple modes of communication, and iterative process are included as process elements in each of the process guides. According to these guides, the design process begins at what is termed the proposal or concept phase and concludes as early as the finalization of construction documents and as late as the beginning of actual construction activities. The processes guides all encourage the inclusion of the owner, design firm, construction experts, estimators, system engineers, operations and maintenance professionals, technical specialists and end users (ANSI & The Institute for Market Transformation to Sustainability, 2007; AIA, 2007; Busby, Perkins + Will, 2007). Bringing team members into the conversation early serves a number of purposes. First, it provides the opportunity for the project team to establish a common vision for the project and to clarify project goals. Second, a strong sense of the importance of collaboration among the team members is established and a tone of partnership, which is assumed to carry on throughout the duration of the project, is established at initiation (Kibert, 2008). Finally, each player brings both an established skill set and a fresh perspective (at least on matters outside her area of expertise) to the design process. This mix of expertise and inexperience sets the stage for the team to explore building systems in new ways with a different understanding of the building as a whole (McLennan, 2006).

The literature on collaborative design processes is seated in both the social sciences and in technology, with some work in business related to learning organizations and learning teams. Senge's The Fifth Discipline stands as the seminal work on learning organizations and knowledge management literature frequently cites Senge. Work teams are becoming the standard organizational unit in all business sectors and require professionals to collaborate more intensively on projects (2006). These work teams are one element of *Communities of Practice*. Identified by Senge as groups of professionals that share an interest in a particular craft and interact in ways that promote professional development, learning and advancement of the discipline, Communities of Practice represent the larger professional community within which work teams may function. For every team member, work on a high level green building means facing challenges to long held assumptions, reorienting from a focus on work in a specialized area to a focus on the building as a system. Kibert asserts, "Green buildings are a new concept to the industry and it is necessary to orient all members of the project team to the goals and objectives of the project that are related to issues such as resource efficiency, sustainability certifications and building health, to name a few" (2008, p. 85). Rohracher describes teams on building design and construction projects as "loosely coupled systems" and asserts that the

tightening of such teams includes both social and technical elements (Rohracher, 2001, p. 143). The processes used for communication serve as tightening social elements, which can introduce new methods, and means, encourage integration and stabilization of the project team, and provide team members with a deeper understanding of sustainable building (Rohracher, 2001). McLennan refers to this tightening as team members beginning to "understand how to make connections between people, their ideas and their solutions" (2004, p. 89). Some transformation from a loosely coupled system to a tighter system takes place as the project vision unfolds within the integrated design process. According to Peter Senge, the vision of a project or company is the "what" team members see when they envision the future or outcome of an endeavor (p. 208). This shared vision serves to create a sense of community among the project stakeholders and orient the team to work as an integrated body. The concept of the building as a whole should lead team members to re-envision not only the design process as a whole, but also the Community of Practice and the more tightly coupled system of the project team in the context if that whole (McLennan, 2004).

At least a small number of teams began this integrated practice long before process guides were developed. In 2005, a multidisciplinary team recognized the need for guidance and standardization of the practice of IDP and met to begin defining and setting standards for use of the integrated design process in the United States. This meeting resulted in the 2007 release of the ANSI/MTS 1.0 Whole Systems Integrated Process Guide (WSIP)-2007 for Sustainable Buildings & Communities©, essentially, codifying one "map" for the practice of IDP (2007). That same year, the American Institute of Architects released their guide to integrated project delivery, which includes use of an integrated design process (2007). The BC Green Building Roundtable also released the Roadmap for the Integrated Design Process in 2007 (Busby Perkins + Will & Stantec Consulting). This paper will explore only the process as detailed in the WSIP Guide.

The Whole Systems Integrated Process

The WSIP Guide recommends bringing a diverse team of stakeholders to the table during the conceptual design phase through both face-to-face and virtual communications. The WSIP Guide describes an iterative process combining research, workshops and analysis involving the team of experts at every point in the process. Beginning with research, this process moves through phases that include Goal Setting and Alignment of Purpose, Concept or Early Schematic Design, Mid-Schematic Design, and Late Schematic Design/Early Design Development. After the fourth workshop (Late Schematic/Early Design Development), the process shifts from design to analysis and refinement. The iterative research/workshop cycle outlined in the WSIP Guide assumes up to four workshops, one after each phase of research (2007). Design Charrettes are one piece of this process, however, the process guide warns against relying on Charrettes as the only team interaction. Charrettes originated as an educational tool at the Ecole de Beaux Arts during the nineteenth century. The word "Charrette" refers to the carts used to collect students' work. In modern usage, the word generally refers to a gathering with the purpose of creating a plan. Often used in urban planning, Charrettes have recently gained popularity in the world of building design (Kibert, 2008; McLennan, 2004). Focused design meetings alone are not enough to create a truly integrated project team and allow potential for work to progress between meetings with little input from key team members (ANSI & The Institute for Market Transformation to Sustainability, 2007). The framework includes the use of design Charrettes as only one mode of communication among project team members, but does not explicitly define additional communication tools. Continued and frequent communication during each research and analysis phase is recommended.

In the Proposal Stage of the WSIP Guide's suggested process structure the design firm and prospective client meet to establish outline the initial scope of the process, design team structure, building program and sustainability objectives. A design team that includes professionals with the necessary expertise, given the project objectives is then formed. This stage is followed by a research phase where base conditions are identified and core project programming is initiated. Once this research is completed, Stage One of the design process begins with a workshop involving the entire design team to set project goals and align the team with the purpose of the project. The team identifies the "deep reason" for the project and for their involvement, as well as design drivers. The team then creates a process flow diagram, reviews the project program in light of the sustainability objectives, and sets a meeting schedule. If the delivery method for the project is not yet determined, it may be determined at this point. After this workshop, the next research and analysis phase begins. The analysis of flows, relationships and economics between the program and the base conditions are refined during this phase. Costing work then begins and metrics, benchmarks and project scope are revisited to check for alignment. Stage Two of the process includes a design workshop involving the entire team, where a conceptual or early schematic design is developed. This workshop is

followed with another research and analysis phase where the design is tested against the core purpose, design drivers and project objectives. Stage Three begins with a design Charrette where the initial design is further refined into a mid-level schematic design. According to the WSIP Guide at this level of schematic design "broad issues of the scheme should be essentially 'locked'" and the team should be working to confirm alignment with goals and objectives, refine the design further, and begin value engineering as necessary (2007, pg. 14). Again, a research and analysis phase bridges stages three and four. During this phase, non-building related sustainability issues are addressed and design concepts are tested against project goals and metrics. Stage Four includes a final workshop where the schematic design is developed further, resulting in the final design. During the analysis phase that follows the team develops detailed drawings and specifications. Once these drawings are completed, design is complete and the bidding and construction process begins.

IDP In Practice

The municipality involved in the case study in this article was one of the first in the country to require LEED® certification for new commercial construction projects, targeting projects in a specific area sited for redevelopment. In early 2008, municipal sustainability certification requirements expanded to include projects in both the community's inner urban core and along a major commercial corridor. The community is in the early planning stages of the renovation of a former residence into the first green model home and education center in the region. The project is a partnership between the municipality and a not-for-profit environmental education center. The municipality purchased a former residence located between a park, the primary pedestrian/bicycle trail and a municipal amphitheatre to improve access among these amenities. Community leaders later identified the former residence as an additional asset and potential new home for the regional environmental education center. The first phase of the project includes a feasibility study regarding achievability of three green building certifications (LEED®, Living Building Challenge and 2030 Challenge) and the development of up to three conceptual designs. The firm retained to complete the feasibility study and initial design work is a well-established architectural and urban planning firm practicing throughout the United States, with practice concentrated in the Midwest. A self-developed integrated design process, involving numerous subject matter experts (SME's) from project initiation through completion, is a key service offered to clients. The use of an integrated process was required by one funding source providing a grant earmarked to pay for the planning process. In addition to the grant requirement, the goal of up to three different green building certifications, each encouraging or requiring that the team employ an integrated design process, served as motivating factors in the choice to employ an integrated process from the outset of the project.

The integrated design process as practiced on this project included an initial research and planning phase, as well as visioning and goal setting work in the form stakeholder meetings that resembled focus groups. The vision and goals developed in these meetings informed the work at three subsequent design meetings focused on more technical considerations including the development of a program of spaces and uses, preliminary goals related to building certification, and, eventually, conceptual designs that included basic energy models and costing information. The entire design process included eight meetings: Five of the meetings focused primarily on the development and communication of project vision and goals, three focused on the creation of a conceptual design and a vetting of the feasibility of achieving various sustainability certifications. The first set of meetings generated project principals and informed the attendance plan for the subsequent meetings, including the design Charrettes and Stakeholder Breakfast. This process lasted roughly seven months, though the final design review and presentation of work products to the municipal governing body have not taken place at the time of this writing.

Project planning began about two months prior to the first meeting. This planning work took place via telephone calls and electronic communication, and involved only the municipality and design firm, this format for the proposal phase reflects the WSIP process, which encourages the design team to work closely with the owner to begin establishing project goals and objective. An in-person meeting with the owner did not take place prior to the first workshop – one place the practice of IPD differed from process guide recommendations.

Key-person Interviews

Key-person interviews (KPI) are the first step in the architectural firm's integrated design process and served the purpose of the initial owner-designer meeting recommended in the WSIP Guide. The purpose of these interviews

was two-fold. First, the firm hoped to gain information about the customer vision for the project. Second, the interviews were thought of as a way to gain buy-in from major project partners . For this project, interviews took place with groups of up to six participants. Four KPI's were held over the course on one day, with each session lasting about two hours. The WSPI calls for one only workshop, including primary project partners, for the purpose of goal setting and alignment of purpose. The owner, architectural firm and the primary future tenant generated a list of participants, each were invited to one session. Participants were loosely grouped by area of expertise and each session included a town staff member, a member of the town council, a tenant representative and the design firm representatives. Because this project is a municipal endeavor, rather than a for-profit building venture, council members were included to ensure that public officials understand and support the project. These choices related to meeting structure and invitees represent another deviation from the letter of the WSIP Guide, however, the choices seem appropriate given the unique circumstances of the project.

The basic format of each session was very informal. The architectural firm representatives facilitated each meeting, with one person acting as primary facilitator and the other as scribe. Reference and resource materials were provided for each session, the materials packet included: house plans for the existing structure, an aerial photo of the property, a summary of the Living Building Challenge rating system, a summary of the LEED Homes rating system, information about the 2030 Challenge and information on The Sustainable House (Minnetonka, MN). The materials provided served as process tools, as guides to the design areas to be addressed in the meetings, and as examples of vision statement and goals on similar projects (Arditi, Elhassan, & Toklu, 2002). At this point in the integrated design process, plans and photos aided participants in conceptualizing the building, as it currently exists. Sustainability rating systems served to inform participants of the design areas to be addressed throughout the process and to orient less experienced participants to more detailed concepts related to sustainable design (McLennan, 2006; Pulaski & Horman, 2005; U.S. Green Building Council, 2008).

Each meeting was framed as a conversation about the vision for the house and property, and served to set some preliminary project goals. Throughout each meeting, the facilitator noted the articulation of "project principals" – described as statements that included information related to project vision and priorities that will guide the design team in their work. The materials packet was referenced through the course of each meeting. A number of these strategies, including provision of a meeting framework, orientation to sustainable design as a concept and activity, and the tagging of "project principals", are included in the literature on the integrated design process (Kibert, 2008; Arditi et al., 2002; Lindsay, Todd, & Hayter, 2003). The WSIP Guide includes a research and analysis process after the initial workshop. During the three-month period following this meeting, the firm compiled the information generated into the project vision and goals for use in subsequent meetings, with virtually no communication among project partners. That they did this independently rather than involving project partners represents another deviation from recommended practice. The firm and municipality also worked together over this period to document the existing building, thus some collaboration on work related to the project did take place.

Expert Design Charrette

The Expert Design Charrette involved about thirty people in one three-hour work session – a much broader stakeholder group than is recommended by the WSIP Guide. Some participants had been involved in the KPI process; for others, the Charrette served as their introduction to the project. This meeting represented the first step in creating a Community of Practice on the project (Senge, 2006). The design firm provided a range of materials, including: large-scale house plans for the existing structure, an aerial photo of the property, a summary of the Living Building Challenge rating system, a summary of the LEED Homes rating system, information about the 2030 Challenge, large sheets of tracing paper, large flipchart pages, and drawing/writing tools. Visual cues were included in the form of flipchart pages, plans and photos, as were the materials necessary for participants to begin to create drawings of potential design features. These participant-generated drawings serve as both visual cues and as brainstorming opportunities (Arditi et al., 2002). Design areas were once again established by reference to and availability of sustainable building rating systems (McLennan, 2006; Pulaski & Horman, 2005; U.S. Green Building Council, 2008). The design firm opened the meeting with a short presentation, focused on some sustainable building basics, the firm's credentials, work thus far, and the project principals developed during the Key-person Interviews. The WSIP Guide recommends the development of a project goals matrix. Rather than a matrix provided to participants showing interaction between goals, the firm provided a short list of principals as part of the presentation. This presentation oriented new members of the group to the project and provided a review for those

who attended KPI's (Lindsay et al., 2003). The group was then given a virtual tour of the project site and an introduction to techniques used in the design and construction of high performance buildings. The presentation ended with three prompts. Participants were encouraged to break into groups, with an eye toward including diverse skill sets, and then work as a team to answer these three prompts. Both graphic and textual answers were encouraged and the groups were directed to the materials on each table as brainstorming aids. The firm representative recorded results on the large flipchart pages and collected them at the close of the meeting. The structure of this group work was consistent with recommendations in the work of Lindsay et al., (2003) and Pulaski et al., (2005). The final exercise involved each participant coming up with what the firm termed an "elevator pitch" for the project. These pitches were brief descriptions, one to three sentences, of the project. This project visioning served the purpose of gaining understanding about how the group concept of the project is developing (Arditi et al., 2002; Design Firm, 2009; Pulaski et al., 2005). The information gathered by the firm in this workshop was used to develop a program of spaces and uses in collaboration with the primary future tenant, and to begin work on a conceptual design scheme.

Stakeholder Breakfast

Due to the unorthodox nature of the funding plan, the firm chose to hold a stakeholder meeting to share the project vision and provide information about project progress. The collaborative nature of the facility opens the door for a wide range of stakeholder involvement. Invitees included representatives from local universities and colleges, banking professionals, local politicians, economic development organizations and construction industry professionals. The structure of this meeting was relatively formal, with the firm presenting the project vision, information about the planning and design process, and opportunities for stakeholder involvement identified thus far. This meeting was brief, lasting about one hour. The WSIP Guide does not include a meeting of this kind; however, this additional meeting was not focused on design work and represented a valuable addition to the process given the project's unorthodox funding plan.

Integrated Design Charrette I

The most structured of all the meetings in the process, this work session was also the longest lasting about five hours. This first integrated design Charrette closely resembled the second workshop called for in the WSIP Guide, the purpose of which is to begin developing a conceptual design and may include the development of an early schematic design. Participants included local code officials, the design team, a mechanical engineer, an energy consultant, the owner, future tenants, a renewable energy expert, and a local residential contractor. This meeting further defined the players who will make up the CoP on the project (Senge, 2006). A robust materials packet was provided to participants. The packet included; the initial program developed with the primary future tenant, floor plans and section views of the existing structure, two preliminary design scenarios (space configuration only), preliminary LEED® Homes checklist, and energy use information for the existing structure. Heavy on visual cues and including a number of models in the form of axonometric representations of potential designs, the materials packet was geared toward work on a building and site level (Arditi et al., 2002; Pulaski & Horman, 2005). In alignment with the WSIP Guide, this work was completed during the research and analysis period between workshops. During this research and analysis phase, the firm had more interaction with the project team, involving subject matter experts in the form of energy consultants (one local energy auditor and a systems designer who works with the firm frequently) and the future tenant for program development.

The meeting began with a short presentation about the process to this point, project principals identified through previous meetings, the goals for the meeting and an orientation to the design scenarios provided by the firm. The firm provided seven major deign choices, which would significantly influence design work from this point. The firm oriented the group to the work goals for the meeting and clearly defined the decision making process during a Charrette (Lindsay et al., 2003). The firm vetting process is simple; a topic is raised for discussion, a proposed solution/design idea is put forward, the team vets the proposal, the group then decides by a "thumbs up or down" vote on whether to explore the proposal further or to shelve the idea. This process is repeated for each design choice. The firm led the group though discussion related to four of the seven choices over the course of the morning. Participants were encouraged to use many communication forms including brainstorming, sketching, and examining virtual models of the structure (Arditi et al., 2002). A working lunch provided an opportunity for some information sharing on energy analysis. Design work continued after lunch, with the same vetting structure, and the remaining design choices were addressed.

Integrated Design Charrette II

The final working meeting involved thirteen participants, all of whom had been present at other project meetings, and included owner representatives, code officials, an energy consultant, future tenants, a local residential contractor and facilities management professionals. The meeting lasted four hours and time allowed for the resolution of a number of key design decisions. The firm representatives opened the meeting with a review of consensus decisions and set out questions and design proposals for group discussion: The firm then presented their design work to this point. This work was completed during the research and analysis phase with little involvement of project team members, other than the firm affiliated energy consultant. The materials packet consisted of photos and floor plans of the existing structure, a short section of the existing structure and proposed levels, a long section of the existing structure and proposed levels, wall sections showing proposed insulation plan, area drawings of three program options (labeled A, B and C), sketches of three roof options and an energy budget. Materials included more building and site information, and less information about project vision and goals (Arditi et al., 2002). The group reviewed the proposed program options, discussing circulation and the needs of the future tenants. Group members worked together as a large group, as well as in side conversations assessing the pros and cons of each program option. The firm used few formal facilitation tools. Participants relied heavily on the visual cues provided by the firm and work included much sketching as a primary communication tool (Arditi et al., 2002).

Design Review Meeting and Presentation of Work Products

At the time of this writing, there are no scheduled dates for the Design Review Meeting and Presentation of Work Products. The participatory phase of the design process is complete, however the municipality and design firm are facing scheduling difficulties due to unrelated projects. The two meetings that will provide closure for this phase of the process have been put on hold until the issues related to outside projects are resolved. The firm did submit the final work product packet, which included one conceptual design scheme (DS1), a Cost Estimate Report for DS1, a Cost Breakdown by Systems for DS1, an Energy Cost Budget for DS1 and a Mechanical Narrative for DS1. These materials were developed during the final research and analysis phase, and involved only firm affiliated subject matter experts (an energy consultant and costing expert).

Conclusion

The integrated design process as practiced on this project included an initial research and planning phase, visioning and goal setting work in the form stakeholder meetings that resembled focus groups. The vision and goals were used to inform the work at design meetings. The entire design process included eight meetings spread over four working days. Five of these meetings focused primarily on the development and communication of project vision and goals, allotting a significantly greater proportion of time to visioning and goal work than recommended in the WSIP guide. Three meetings focused on the creation of a conceptual design and a vetting of the feasibility of achieving various sustainability certifications – a number that is more in line with recommendations for practice detailed in the guide. Design development on the project progressed only to the schematic design phase and did not include the Early Design Development phase that is part of the WSIP Guide process. At this design phase, the WSIP Guide includes three workshops in the recommended process, with research and analysis phases between each. The firm developed process as practiced on this project reflected an adherence to the WSIP best practices in its inclusion of three workshops similar in form to those detailed in the guide and some limited contact between project partners during research and analysis phases. The design firm added a number of activities to the process that were not included in the activities detailed in the WSIP Guide. The Stakeholder Breakfast more closely resembled a marketing event, than a design related meeting and significant portions of the five earliest meetings were dedicated to education of participants about green building principals and practices, as well as certification systems. These additional activities, while outside of the map outlined in the guide, made sense in the context of this particular project.

The integrated design process practiced by this firm included many of the best practices detailed in the WSIP Guide, while accommodating the unique challenges that grew out of the nature of the project. The firm made choices that deviated from best practices in two primary areas. The first was the level of project team involvement during research and analysis phases. The design firm worked more independently during the first and final research and analysis phases than is recommended. Whether this choice was a calculated decision to manage time or staff

resources, or simply a step back into a more common form of architectural practice is unclear. If in the study of future integrated design processes this choice surfaces repeatedly, it may indicate a need for further study related to the practice of cooperative work and the dynamics of Communities of Practice. The second deviation was the firm's choice to include significantly higher levels of community stakeholder involvement in the development of the project vision than recommended by the WSIP Guide. This choice seems very appropriate given that the project is a public-private partnership that can only be completed with significant community support and involvement. These high levels of stakeholder involvement would be unnecessary on most commercial and residential construction projects, though replicating this model might be advantageous for municipal projects and projects hoping to rely on fundraising campaigns, grant writing and private sponsors as funding sources.

This second choice illustrates one way in a team may consciously choose to deviate from "paper" guides based on the circumstances of the project. This case raises a number of questions related to the choices design teams make based on the larger context of the project. Here an unorthodox funding structure, significant political exposure, and the need for participant education may have had significant effects the choices made by the design firm. It makes sense to consider other contextual elements of design projects that might compel design teams to deviate from recommendations outlined in guides like the WSIP Guide. The relative inexperience of participants necessitated high levels of education within workshops, taking time away from design development work. This choice represents a tradeoff between increased community awareness and buy-in and work efficiency, which may be acceptable on one type of project but not on others. The design of high performing building systems poses challenges and often necessitates trade-offs. The real world practice of integrated design seems to mirror this dynamic, requiring teams to make choices about where to follow process guides to the letter and where to deviate based on the context of their project.

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