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Concrete Embodied Carbon Study

Maab Mohammed
Portland State University

Tabassum Kalam Khandoker
Portland State University

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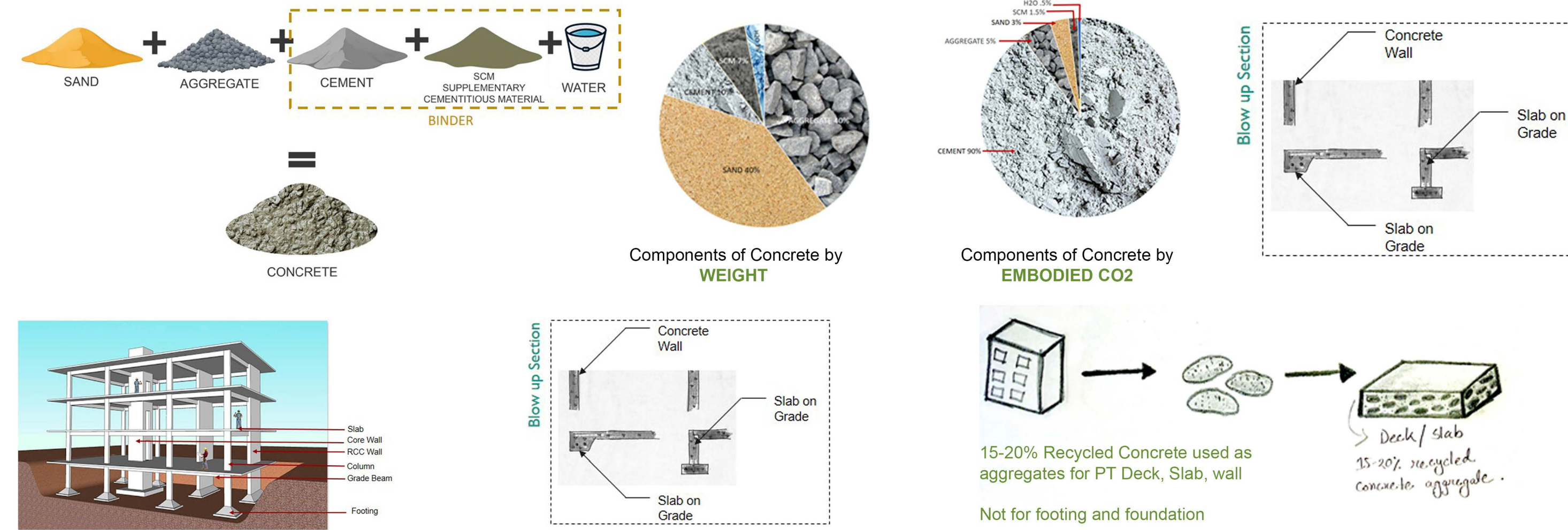
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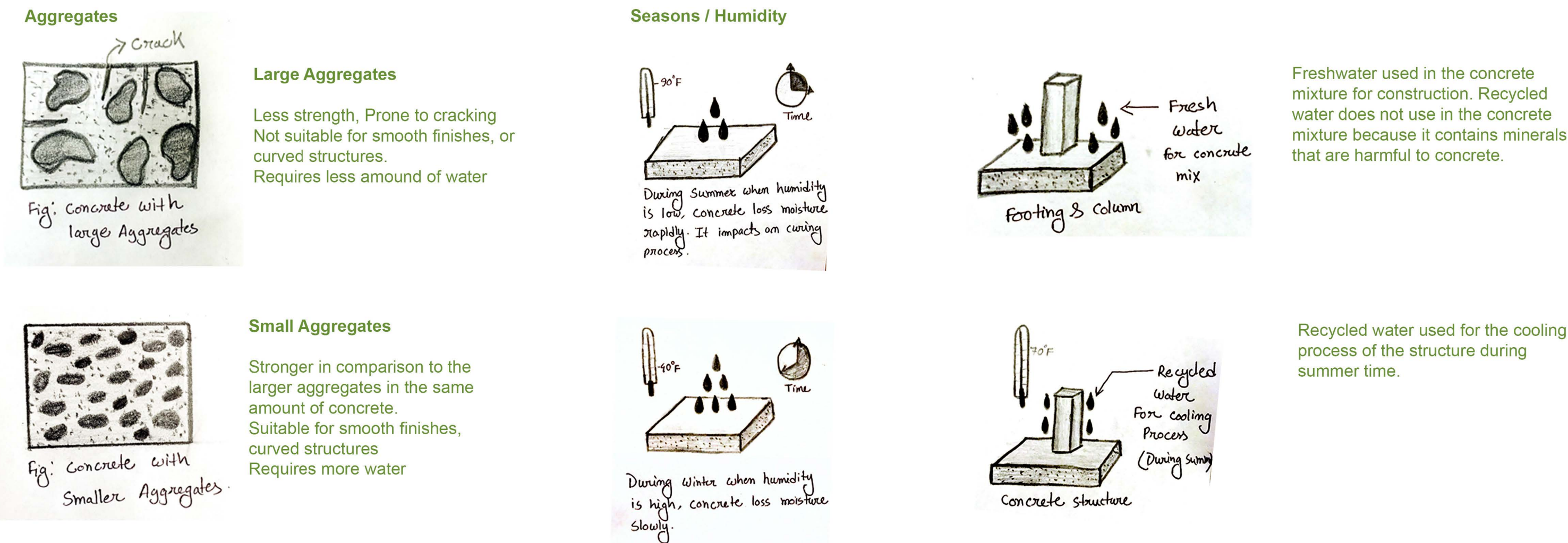
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Abstract

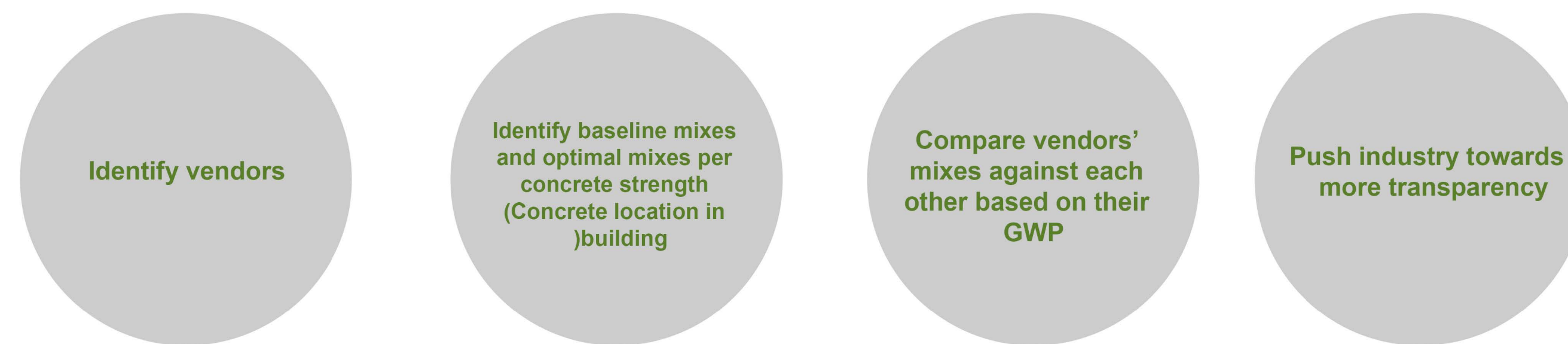
Generally, in concrete, cement contains a significant amount of embodied carbon. For this reason, designers are looking for different mixtures and sources for the replacement of cement in concrete. Which can provide the optimum strength by using a minimum amount of cement



Variables in Concrete



Methodology



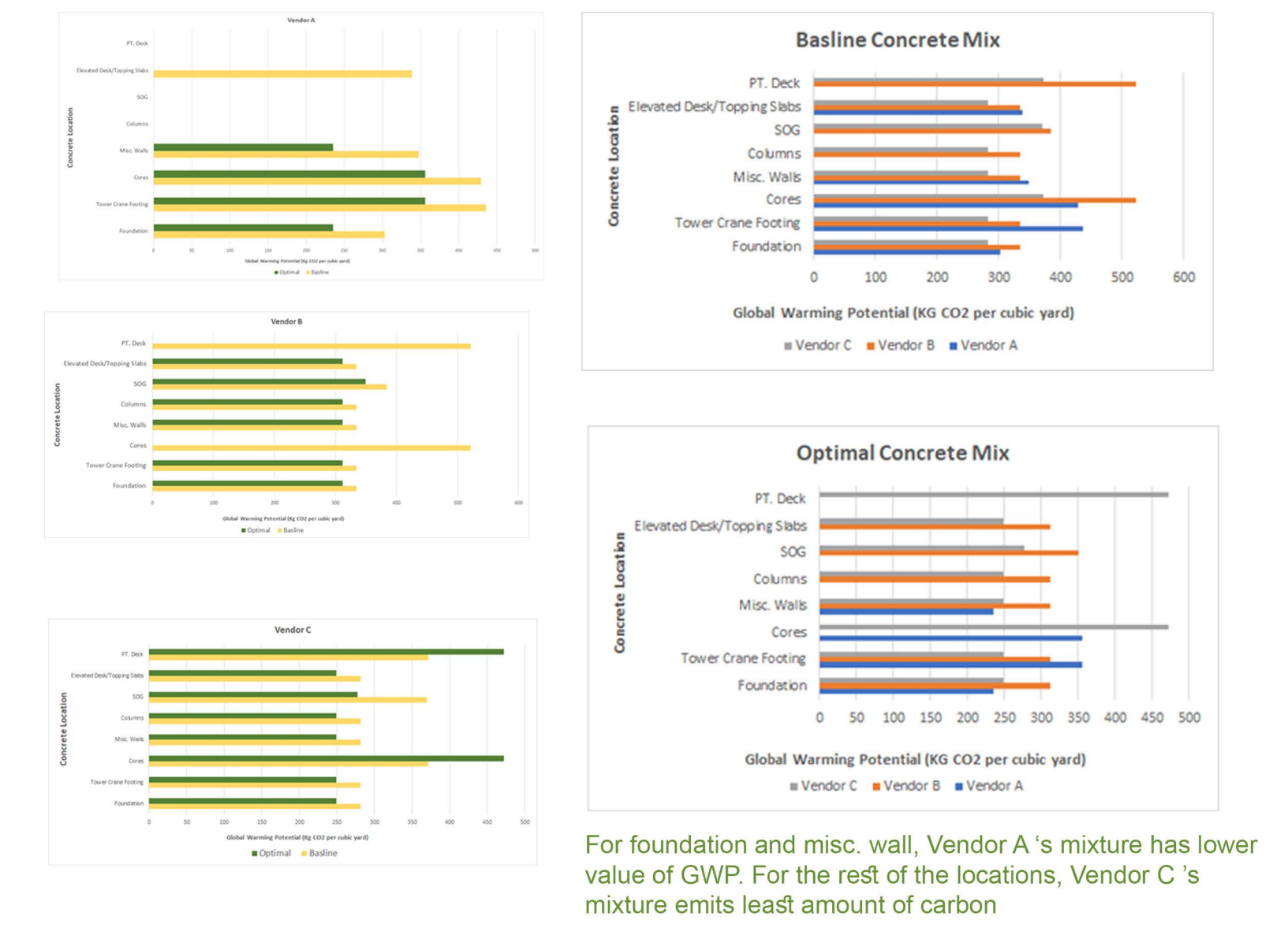
SCM: Supplementary Cementitious Material
EPD: Environment Product Declaration
GHG: Green House Gas
GWP: Global Warming Potential (KgCO2 per Cubic Yard)
LCA: Life Cycle Assessment
ASTM: The American Society for Testing and Materials
ACA: American Concrete Association

Results

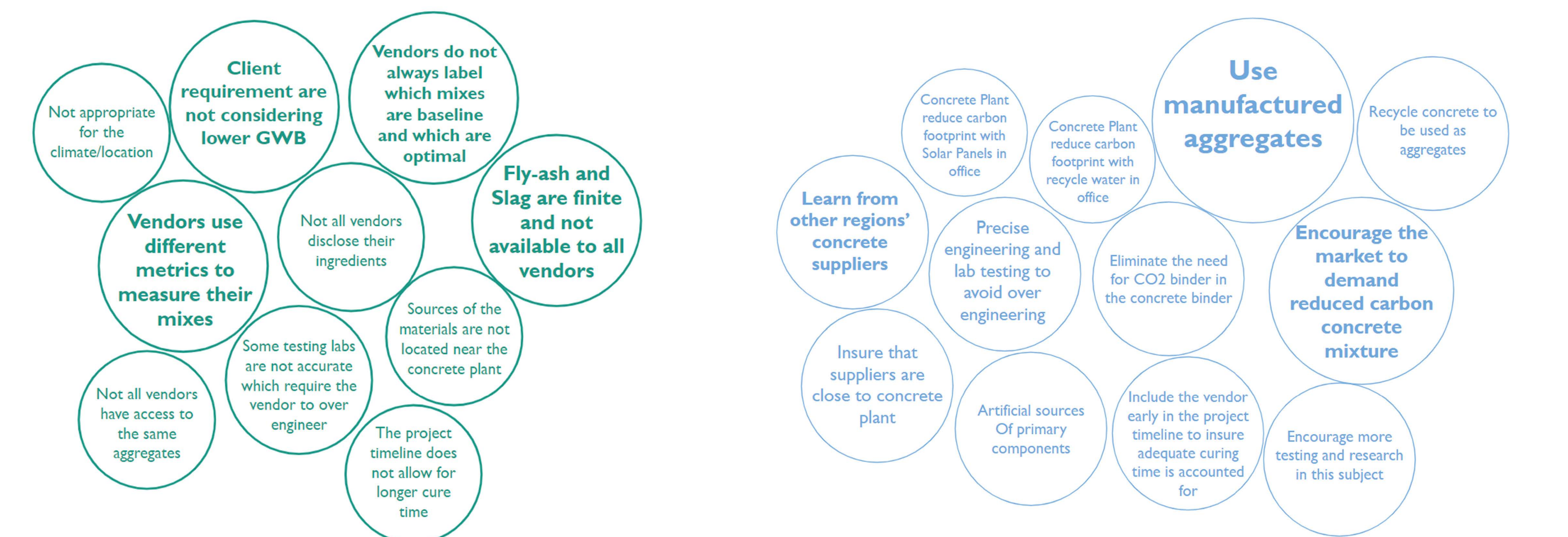
PSI	Concrete Location	Vendor A				Cure Days	% GWP to Baseline
		Baseline	Mixture ID	Optimal	Mixture ID		
4000	Foundation	305	Mix 405C820A	234.99	Mix 06FF522N	28	77.55
4000	Tower Crane Footing	435.57	Mix 405C820A	355.75	Mix 06FF522N	28	81.67
6000	Cores	429.1	Mix 405C820A	355.75	Mix 06FF522N	28	82.91
4000	Misc. Walls	347.2	Mix 405C820A	234.99	Mix 06FF522N	28	67.68
4000	Columns				Mix 06FF522N	28	
5000	SOG				Mix 06FF522N	28	
4000	Elevated Desk/Topping Slabs	338.37			Mix 06FF522N	28	
6000	PT. Deck				Mix 06FF522N	28	

PSI	Concrete Location	Vendor B				Cure Days	% GWP to Baseline
		Baseline	Mixture ID	Optimal	Mixture ID		
4000	Foundation	334.09	Mix 405C820A	311.16	Mix 06FF522N	28	93.14
4000	Tower Crane Footing	334.09	Mix 405C820A	311.16	Mix 06FF522N	28	93.14
6000	Cores	521.4	Mix 6500D502			28	
4000	Misc. Walls	334.09	Mix 405C820A	311.16	Mix 06FF522N	28	93.14
4000	Columns	334.09	Mix 405C820A	311.16	Mix 06FF522N	28	93.14
5000	SOG	383.79	Mix 45WM329N	349.38	Mix 45ID422A	28	91.03
4000	Elevated Desk/Topping Slabs	334.09	Mix 405C820A	311.16	Mix 06FF522N	28	93.14
6000	PT. Deck	521.4	Mix 6500D502			28	

PSI	Concrete Location	Vendor C				Cure Days	% GWP to Baseline
		Baseline	Mixture ID	Optimal	Mixture ID		
4000	Foundation	281.25	2440N17200	249.27	2440N17F00	28	88.63
4000	Tower Crane Footing	281.25	2440N17200	249.27	2440N17F00	28	88.63
6000	Cores	371.26	2460N3R2PV	471.86	2460GARC50	28	127.10
4000	Misc. Walls	281.25	2440N17200	249.27	2440N17F00	28	88.63
4000	Columns	281.25	2440N17200	249.27	2440N17F00	28	88.63
5000	SOG	369.66	2450N3V259	277.4	2450N15F00	28	75.04
4000	Elevated Desk/Topping Slabs	281.25	2440N17200	249.27	2440N17F00	28	88.63
6000	PT. Deck	371.26	2460N3R2PV	471.86	2460GARC50	28	127.10

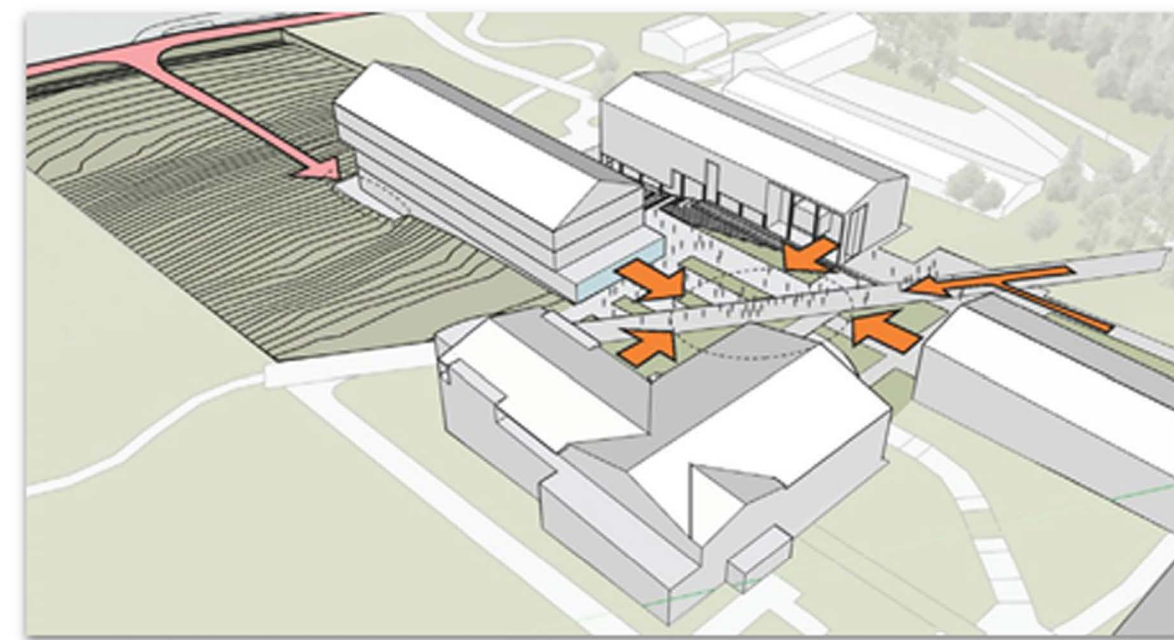


Challenges and Recommendations



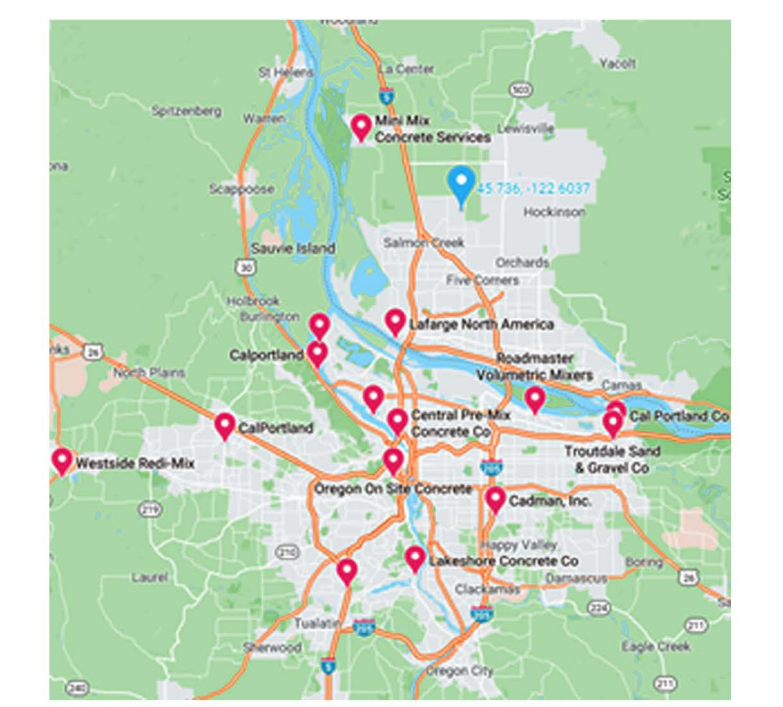
Client

Washington State University-Vancouver Life Sciences Building



The project is a 60,000 sf new construction academic research building for Washington State University Vancouver. The building is currently in the programming phase and will include labs, offices, classrooms and other support spaces

Location of Vendores near construction site, Vancouver, Wa



The project will meet a minimum LEED Gold level of certification as set by WSU. In addition, SRG Partnership with Andersen Construction will be focusing on reducing embodied carbon on the project wherever possible, with a specific focus in the earliest stages on the selection and design of the structural system through quantifying the relative reduction in GWP

