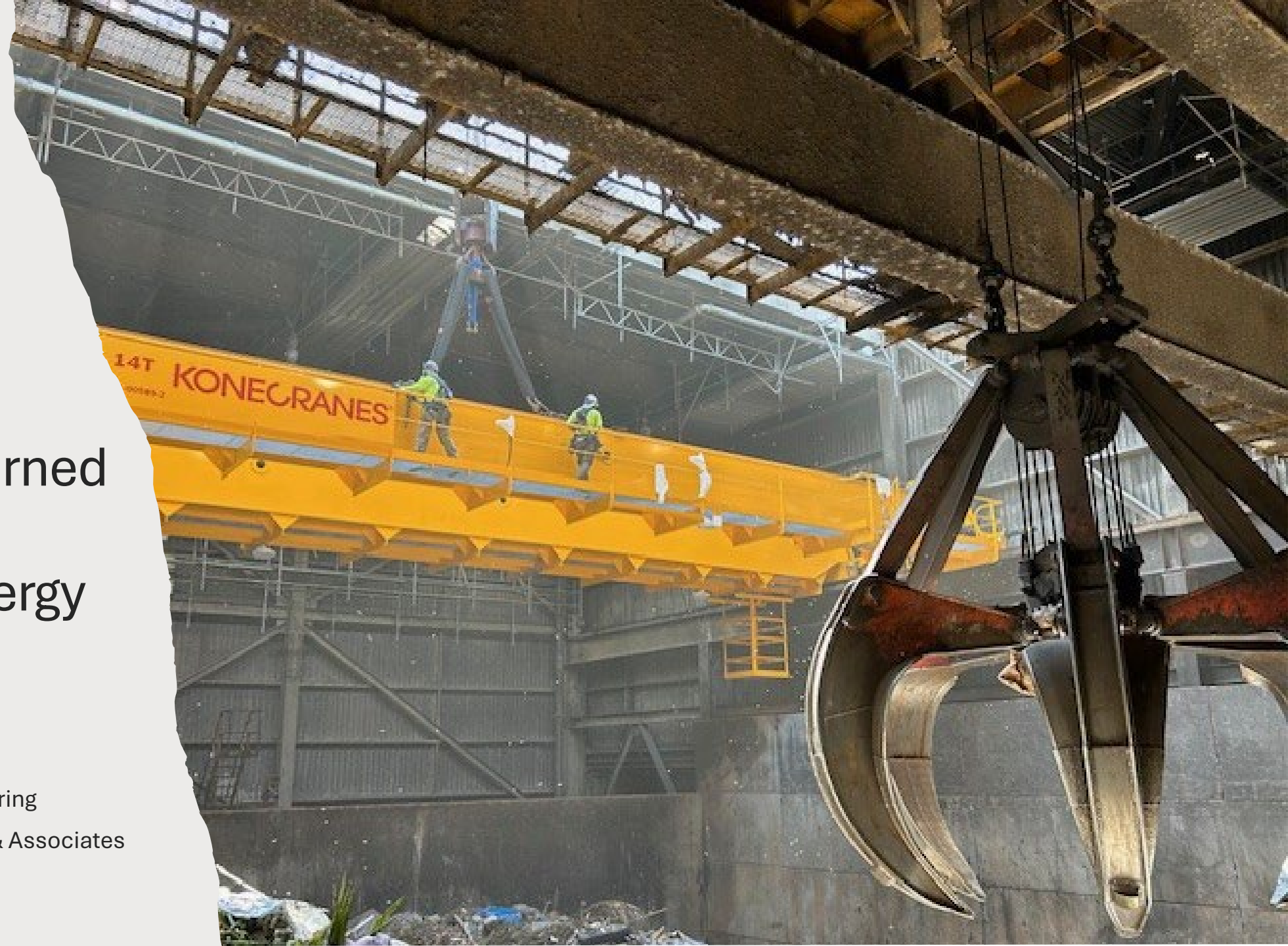
Lessons Learned from Recent Waste to Energy Design Build Projects

Jason Gorrie – JMG Engineering

Justin Roessler – Roessler & Associates



Design Build

- The majority of municipal solid waste projects are design bid build (DBB)
- The term design-build gets used a lot but examples of solid waste projects executed with DB are limited
- **Design Build Institute of America** - “It is as much a mindset as it is a process. It is intended to be a highly collaborative, fully integrated undertaking that is built on trust, mutual respect, teamwork, innovation and creative problem solving.”

Design Bid Build

- Traditional method with three phases: Design → Bid → Build
- Separate contracts for designer and contractor
- Linear process with little contractor involvement in design
- Can create adversarial contractor, owner, engineer relationship
- Understood by local governments

Solid Waste Project Delivery

- Landfills projects have traditionally followed design bid build process
- Logical sequence of delivery – design can be progressed to construction during permitting
- Limited number of items for procurement – largely civil site project
- Pool of available bidders

Design Build

- Single contract for both design and construction
- Collaborative approach with integrated teams
- Overlapping design and construction phases
- Less frequently used in the municipal solid waste sector
  - Waste to Energy facilities
  - Biosolids management projects
  - Facilties projects with accelerated timelines
- Less understood by local government and their procurement teams

Differences in Roles and Responsibilities

Design Bid Build

- Engineer of Record retained by owner
- Bids 100% plans and specs
- Contractor retained by owner
- “Low-bid” construction award
- Engineer provides support to during bid and construction process

Design Build

- Owners Representative drafts *Design Criteria Package*
- Single award for engineering and construction
- Design is developed following award
- Construction begins while design is underway
- Cost typically one component of procurement process

Benefits of Design-Build

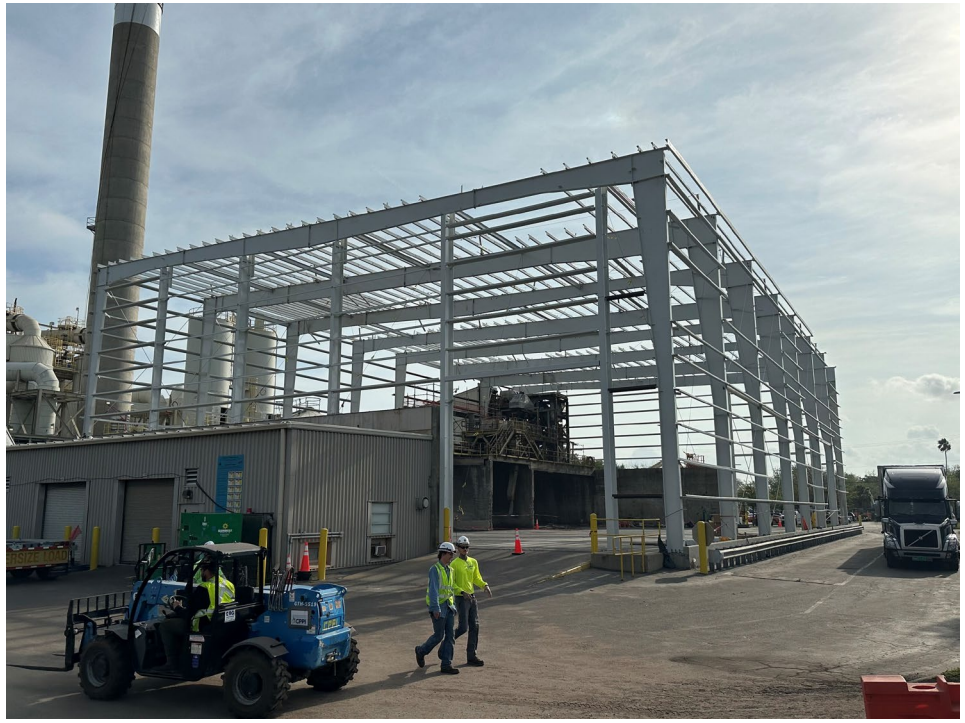
- Faster overall project delivery
  - Reduced municipal procurement
- Opportunities for collaboration and constructability review as design is developed
  - Goal is to limit issues in the field resulting in cost savings
- Increases feasibility of complex multidisciplinary projects
  - Often times vendor drawings are needed to progress overall design

Challenges

- Requires collaboration and a shift in the mindset of all parties

City of Tampa McKay Bay – WTE Retrofit

- $100M dollar facility major retrofit
  - 1,000 ton per day mass-burn WTE facility
  - Refuse cranes, ash dischargers, vibratory conveyor, ash storage building, cooling tower, condenser, and controls system demo/installation
- Charles Perry Partners, Inc – Design Builder
  - JMG Engineering –Technical Advisor to Design-Builder

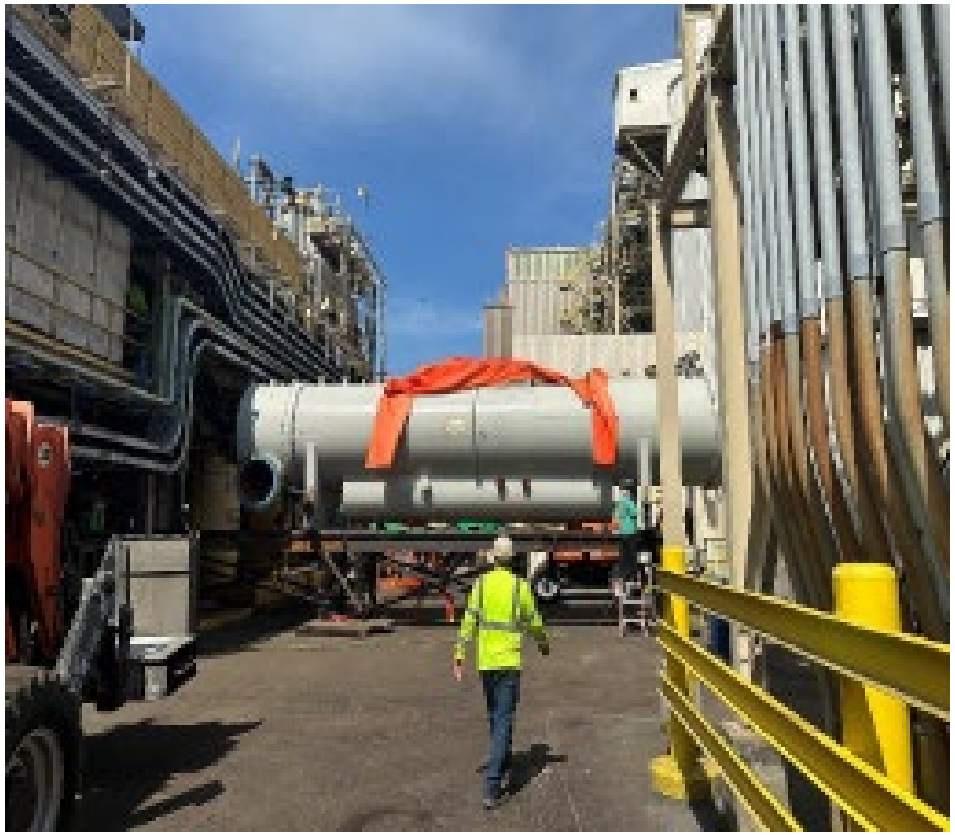


City of Tampa McKay Bay – WTE Retrofit

- Project design criteria report was very concise
- Resulted in ambiguity around certain scope elements
- Discovery work in several facility systems (e.g. turbine) resulted in the need for expanded scopes

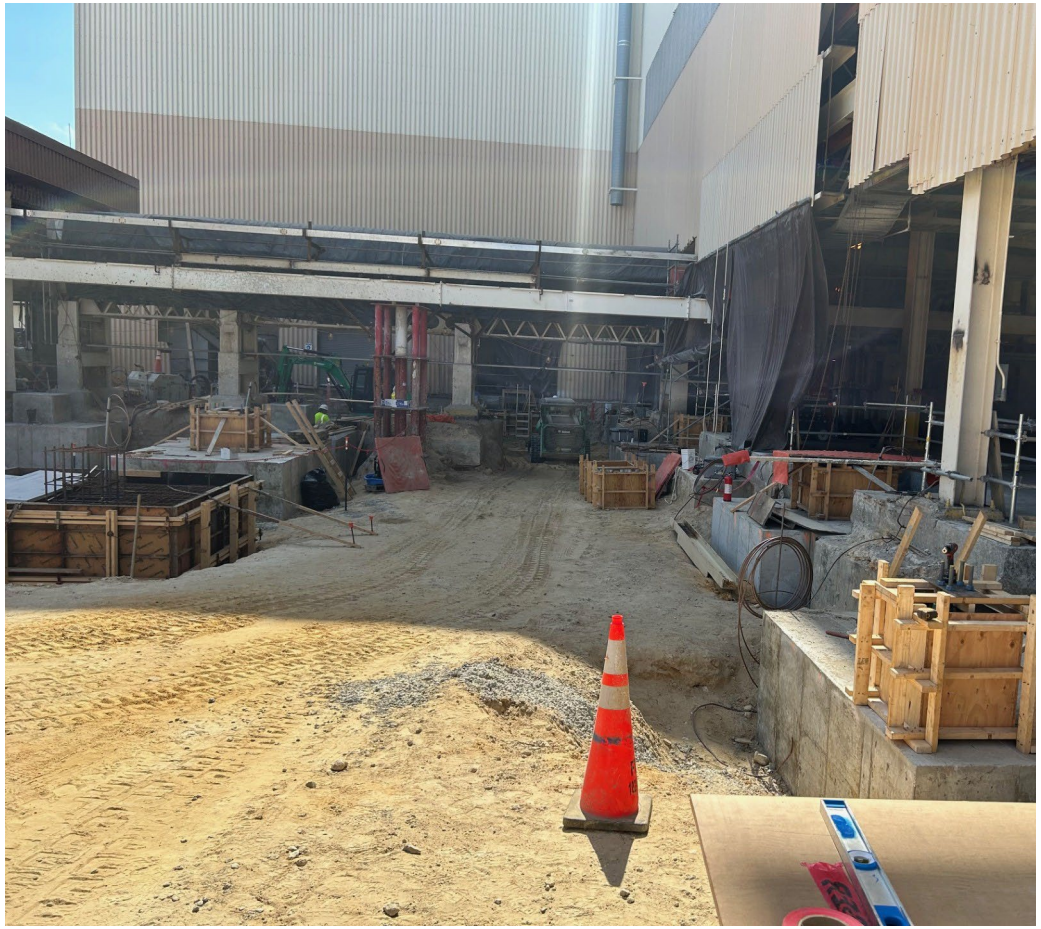
City of Tampa McKay Bay – WTE Retrofit

- CPPI project team was new to working together
- Enercon was retained as EOR with limited time prior to project construction start
- Several facility components had been independently procured
  - Required additional design work
- Coordination of work in limited space with other independent projects was challenging



Pasco County – WTE Expansion

- $250M dollar 500 ton per day expansion
  - Addition of boiler – APC – turbine/generator – and supporting components
- Reworld Pasco, Inc – Design/Builder
- JMG Engineering, Inc. – County's Owner's Representative



Pasco County – Project Contingency Fund

- Pasco's design build agreement with Reworld included a "project contingency fund"
  - Bucket of money that Reworld could use for *qualified* cost overruns
  - Cost underruns in the schedule of values returned to contingency fund
  - Represents approximately 12% of overall project dollar value
  - Includes certain "force majeure" type components
- Balance of fund split between the parties at the end of the project
- Goal was to incentivizes the parties to work together

Pasco County – Waste to Energy Expansion

- Reworld, MasTec – GC, and Enercon –EOR have not previously delivered a DB project together
  - Reworld has worked with both entities previously, but not together
  - GC was awarded later on in the project
- Vendor drawings and long lead procurement have become a critical path items for project delivery
  - Contract award was issued near end of Covid
- Parties working together to prioritize engineering deliverables that create additional workfronts for contractor
- Reworld is working to manage its subcontractor risk around project Geotech and delays

Pasco County – Waste to Energy Expansion

- Owner's representatives providing technical review for compliance with project design criteria
- Focus on project quality and ensuring Reworld is meeting overall project scope
- Goal is to work collaboratively and mitigate potential claims
- Not dictating detailed design or means and methods

Takeaways

- For design-build to be successful it must be a collaborative process
- Proper development of the design criteria package and commercial agreements is critical
- Project risks and unknowns will still drive costs
  - In WTE facilities many of these relate to common systems - site due diligence key
- Create commercial structures that align the parties
- Select experienced and trusted partners who have worked together
- Project owners should understand their roles and responsibilities