ASX:FBR


# FBR Corporate Presentation

**June 2022**

# About FBR

- **FBR** designs, develops, builds and operates dynamically stabilised robots
- **FBR**'s flagship product, **Hadrian X®**, is the world's most advanced construction robot
- Capable of building the walls of brick or block houses in as little as a day, **Hadrian X®** is designed to produce brick structures safer, faster, cheaper, more accurately and with waste virtually eliminated
- **Hadrian X® is block agnostic**, having demonstrated laying capability with clay, concrete, autoclaved aerated concrete (AAC) and calcium silicate blocks in both full pallets and pre-cut, sequenced pallets
- Enabled by **FBR**'s **Dynamic Stabilisation Technology® (DST®)**, the **Hadrian X®** takes the precision of traditional indoor robotics into outdoor environments on a fully mobile truck-based platform
- **FBR** and the Hadrian X® technology currently offers a **Wall as a Service®** commercial model, where builders can order robotically erected walls with certainty on timing, cost, safety and waste
- **Hadrian X®** prototypes are in the field building for top tier builders in Perth, Western Australia on commercial terms
- Global brick/block low rise construction market is approximately 525 billion bricks per year, estimated to be in excess of A$500 billion per year to supply and lay

# FBR Corporate Snapshot



## Capital structure (as per last ASX disclosure on 16 May 2022)

| | |
|---|---|
| Ordinary shares on issue | 2.4b |
| Average daily volume (last 3 months) | 2.0m |
| Gross cash and receivables | $11.0m |
| FY22 R&D tax refund receivable | >$4.0m |
| R&D tax loan secured against R&D tax refund | -$4.0m |
| Residential construction finance (secured against residential properties) | -$1.0m |
| Equipment finance (secured against equipment) | -$0.8m |
| Hadrian finance (secured against 2x Hadrian X robots) | -$2.3m |

## Directors

| | |
|---|---|
| Richard Grellman | Non-Executive Chairman |
| Grant Anderson | Non-Executive Director |
| Greg Smith | Non-Executive Director |
| Nancy Milne | Non-Executive Director |
| Mike Pivac | Executive Director – MD & CEO |
| Mark Pivac | Executive Director – CTO |

## Corporate

- Listed in 2015
- $130+ million invested into technology
- 92 employees over 3 continents
- R&D, Engineering & Manufacturing facilities in Western Australia
- Global commercial opportunity – 100% owned
- Global IP – 100% owned, no royalty obligations

## Substantial Shareholders

| | |
|---|---|
| Mark Pivac (Founder) | 13.7% |
| FIL Limited | 9.2% |
| Mike Pivac (Founder) | 5.3% |

# FBR Solution

- **FBR** has the most compelling technology in robotic construction and it is widely accepted that automation is the future of the construction industry
- **Hadrian X®** is the only solution that is fully mobile without sacrificing utility, versatility, de-automation or speed of completion
- Minimal mobilisation and demobilisation time – no gantry setup, minimal site footprint, can build from the road or any other side of a construction site
- Can use existing building materials and produce walls that are visually the same as existing walls
- Architectural software automatically populates bricks from existing designs to generate **Hadrian** build file
- Compliant with building codes in some jurisdictions, working toward certification in others (ICC certification in the United States; CE certification in Europe)
- Prototypes are currently providing Wall as a Service® for top tier builders in Western Australian on commercial terms, delivering structures faster, more accurately, safer and with less waste than traditional construction methods
- Global scaling plan of selling robots manufactured by an OEM to local operating entity partners and leasing back to operating entities to provide Wall as a Service® with a zero capex expansion plan for FBR
- Preliminary DST testing complete on potential 3D concrete printing application – results extremely promising using existing technology and platform

# Revenue generating tech

- **Record sales** – receipts from customers for the 9 months of FY22 of $736,000, a 6,000% YoY increase
- **Completed builds for customers** – Walls completed on four residential, two low-rise commercial structures, with another 16 residential structures in progress
- **Pipeline of 24 confirmed upcoming and in progress builds** for builders with expected revenues of over $1.1 million
- **Two builds in Wellard remaining to complete five home Wellard portfolio** – revenue in excess of $2 million in FY23 anticipated from sale of five home portfolio. One of the remaining homes to be built using Wienerberger Porotherm blocks
- **Assembly commenced on two next generation Hadrian X® robots** – higher lay speed, capability to handle even larger blocks, longer reach and improved reliability
- **Non-binding term sheet for up to 5,000 homes in Mexico** with GP Vivienda
- **Market entry feasibility study for UAE** – MOU with Ministry of Energy and Infrastructure executed
- **International clay block market unlocked** – Hadrian X® demonstrated laying largest clay blocks currently in production (Wienerberger Porotherm R25s) in addition to concrete blocks
- **AAC and calcium silicate block testing complete** – Xella product successfully used to build structures with the Hadrian X®
- **Builders designing Hadrian-optimised buildings** as gen 2 architectural software unveiled
- **H01 laying zero waste pre-cut blocks of multiple types on sequenced pallets** in a suburban environment, as precursor to the future of block production
- **Additional product revenue streams under development** with multiple DST and digitalisation-related R&D projects underway

# Benefits of Hadrian X®



## HEALTH AND SAFETY

- Removes the repetitive work, stress and injury including sprains and strains from the industry that many bricklayers suffer from due to years of hard labour
- Removes all manual labour from construction site during structure build (except minimal FBR quality control interactions)
- No working at elevated heights during blocklaying process. Removes the need for scaffolding, trestles or boards to reach the top courses and second storey
- Due to the use of construction adhesive, there is no exposure and inhalation of cement and sand dust while mixing mortar. Both contain silica which has been recognised as a serious industry hazard
- No inhalation of dust through dry cutting bricks manually (when a brick saw is used)
- Less people required at work site during construction and less trips to site required by workers
- No injuries due to manual handling of products and use of hand tools. **Hadrian X®** completes all necessary brick cuts

# Benefits of Hadrian X®

## ENVIRONMENTAL

- A much cleaner site with no materials dispersed across the build zone and removal of site hazards
- Reduced waste and exposure to environmental incidents. H01 zero waste sequenced pallet capability massively reduces waste produced on site and cost of waste removal
- No sand, cement or water required on site, eliminating the impact of extraction, soil screening, removal and management of leftover waste
- No hazardous dust from the use of cement and sand (both containing silica) with the potential exposure to the local environment, workers and public within vicinity
- TAD software heavily reduces offcuts & waste from block manipulations due to virtual inventory optimisation and the machine managing all offcut material
- Site cleanliness maintained reducing waste to landfill and the high cost associated with this
- Up to 10% of brick/blocks are wasted in manual bricklaying from overordering, logistics and handling, and cutting bricks onsite
    - This is equivalent to up to A$15 billion waste in the A$175 billion of global brick/blocks produced and sold per year
    - **Hadrian X®** will save more than half of this global brick/block waste per year
- Able to lay green building products like Xella's AAC blocks and calcium silicate blocks, which have exemplary thermal and acoustic performance

# Benefits of Hadrian X®

**OPERATIONAL**

- Block laying speed significantly faster than manual labour (assuming scarce manual labour is even available)
- Greater accuracy and repeatability than human bricklaying
- Build cost significantly reduced through faster build, greater predictability, greater accuracy and reduced waste
- Digitalises the construction process and helps stakeholders to better understand the structure from inception to delivery to recycle use
- Disruptor to the economic modelling and planning of building structures on residential and commercial sites. When considering the total 'time value of money', there is significant opportunity to not only reduce the time to build the structure, but by using the same single source of CAD information, other 'off site' manufacturing can be carried out concurrently without the need for 'as built' site measurement
- Machine can run 24/7 when required with no onsite human constraints during build cycle
- Solving genuine global skill shortage that will affect future business growth, while improving working conditions for existing and future bricklayers
- Can lay multiple types of existing blocks from multiple block manufacturers

# Hadrian X® Economics in Australia

The larger the block used, the more economical the **Hadrian X®** becomes and the greater the benefit passed on to **WaaS®** customers. The costs below are direct laying costs and exclude all the other ancillary benefits enjoyed by the customer derived from the **Hadrian X®** from its improvements to safety, speed, accuracy and waste.

| Iteration of Bricklayer | Block Type | Laying Speed (blocks p/hr) | Times faster than single manual bricklayer | Cost of laying wall ($/sqm) | Standard double brick houses built per year |
|---|---|---|---|---|---|
| **Manual Bricklayer** | **Standard Clay Maxibrick**<br>305 x 162 x 90mm | 42 | 1x | $57 | 10 |
| **H109** (Hadrian X®) – current performance | **Concrete Masonry Unit**<br>390 x 230 x 90mm | **174** | **7x** | **$35** | **59** |
| **H109** (Hadrian X®) | **Porotherm Clay Block**<br>External: 500 x 249 x 250mm<br>Internal: 500 x 249 x 115mm | **174** | **14x** | **$18** | **166** |
| **H109+** | Concrete Masonry Unit | 250 | 10x | $25 | 119 |
| **H109+** | Porotherm Clay Block | 250 | 20x | $13 | 238 |
| **H110** | Concrete Masonry Unit | 500 | 20x | $14 | 237 |
| **H110** | Porotherm Clay Block | 500 | 41x | $7 | 476 |

**Key Assumptions:** Hadrian X® manufacturing cost at scale: $1 million. Hadrian X® crew: 2 people per 12 hour shift. Hadrian X® useful life: 12 years. Number of 12 hour shifts per year for Hadrian X®: 252. Hadrian X® maintenance and fuel cost per year: $175,000. Hadrian X® laying cost excludes corporate overheads. Standard double brick house has 351 vertical sqm of wall (237m$^2$ internal facing and 114m$^2$ external facing). Manual bricklayers work in a crew of three (two bricklayers and one labourer). Crew lays 1,000 maxibricks per eight-hour day. Equivalent to 108 standard bricks per hour per person. Manual maxibrick laying cost, taking one to two weeks (laying only) would be currently $2.50 per maxibrick laid in Perth, WA, plus allowing for mortar and sundries and cut bricks this equates to approximately $57/sqm wall laid. Hadrian X® laying speeds are averages ignoring planned and unplanned maintenance.

# Hadrian X 110® Target Economics in Western Australia

| H110 - WA | Amount | Units |
|---|---|---|
| WaaS Revenue (Laying and Blocks) | $85 | $/ vertical square meter |
| WaaS Revenue (Laying and Blocks) | $7.1 | $ million / Hadrian per year |
| Hadrian Direct costs (Blocks, labour, adhesive, operations and maintenance) | -$3.1 | $ million / Hadrian per year |
| Hadrian Indirect costs (Hadrian lease, telehandler lease, facilities and corporate overheads) | -$0.5 | $ million / Hadrian per year |
| Profit (Free cash flow before tax) | $3.4 | $ million / Hadrian per year |
| Profit after tax (Free cash flow after tax) | $2.4 | $ million / Hadrian per year |
| Profit margin (before tax) | 48% | % |
| Hadrian X 110 payback period | Less than 1 | Years |
| Wall built | 83,242 | Vertical square metres per year |
| Houses built | 237 | Standard double brick houses per year |

**Key Assumptions:** Hadrian X® manufacturing cost at scale: $1 million. Hadrian X® crew: 2 people per 12 hour shift. Hadrian X® useful life: 12 years. Number of 12 hour shifts per year for Hadrian X®: 252. *Hadrian X® average laying speed of 500 blocks per hour ignoring planned and unplanned maintenance. Blocks laid Concrete Masonry Unit 390 x 230 x 90mm

# Completed jobs and WIP

| Job | Type | Standard Brick Equivalents (SBEs) |
|---|---|---|
| Dayton | Single Residential (now occupied) | 13,759 |
| Byford | Single Commercial (now occupied) | 20,300 |
| Amberton Beach | Single Commercial (now occupied) | 36,496 |
| Wellard #1 | Single Residential (FBR inventory) | 19,008 |
| Wellard #2 | Single Residential (FBR inventory) | 23,900 |
| Wellard #3 | Single Residential (FBR inventory) | 20,083 |
| Wellard #4 | Single Residential (FBR inventory) | Approx. 20,000 |
| Wellard #5 | Single Residential (FBR inventory) | Approx. 20,000 |
| Willagee | 16x Residential (in progress) | 315,707 |
| St James | 8x Residential (builder awaiting approval) | 174,391 |
| | 32 structures | 663,644 |

**Dayton**

- The first display home built by an end-to-end autonomous bricklaying robot anywhere in the world
- Sale settled in July 2021

**Byford**

- FBR's first non-residential structure featuring cavity walls with slab step down
- Currently tenanted by real estate company

**Amberton Beach**

- Largest single structure built by Hadrian to date requiring five different building positions and comprising walls up to 4.8m high
- Childcare centre completed in early 2022

**Wellard #1, #2, #3, #4 & #5**

- Structures owned by FBR, with walls completed and following trades at staggered stages of completion on #1, #2 and #3, with works on #4 and #5 due to commence shortly. Build #4 will be built using Wienerberger Porotherm blocks
- Sales expected in FY23

**Willagee**

- Approximately 80% of ground floors completed, with the top floors much less dependent on the availability of other trades for completion

**St James**

- Council and Water Corp approval pending for commencement of project, planning stages complete






# MOU with Liebherr-Mischtechnik for next-gen Hadrian

- Liebherr-Mischtechnik is a division of the Liebherr International Group, one of the world's largest, most diverse and highly regarded equipment manufacturers

- FBR and Liebherr have an MOU in place to collaborate on the delivery of the next-generation Hadrian X®

- The MoU consists of two phases of collaboration between FBR and Liebherr-Mischtechnik:

  **Phase 1**
  - Ensuring next generation Hadrian X® is suitable for scalable industrialisation and commercialisation
  - Liebherr-Mischtechnik consult to FBR on components, design, control systems and operation of heavy machinery in construction environments

  **Phase 2**
  - Commences upon execution by both parties of a long-term Manufacturing and Commercialisation Agreement
  - Appointment of Liebherr-Mischtechnik as exclusive manufacturer of Hadrian X®
  - Joint commercialisation activities including supply, service and lease structure

- Signed in March 2022

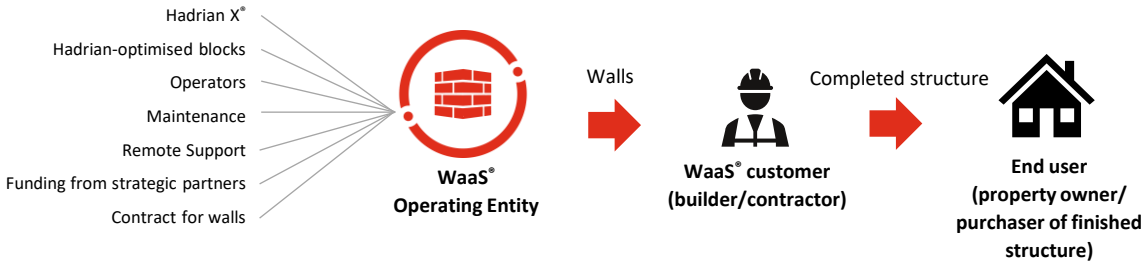
- FBR expects to commence discussions around long-term manufacturing agreement for the next generation Hadrian X® once the first prototype has completed site acceptance testing

# Next-generation Hadrian

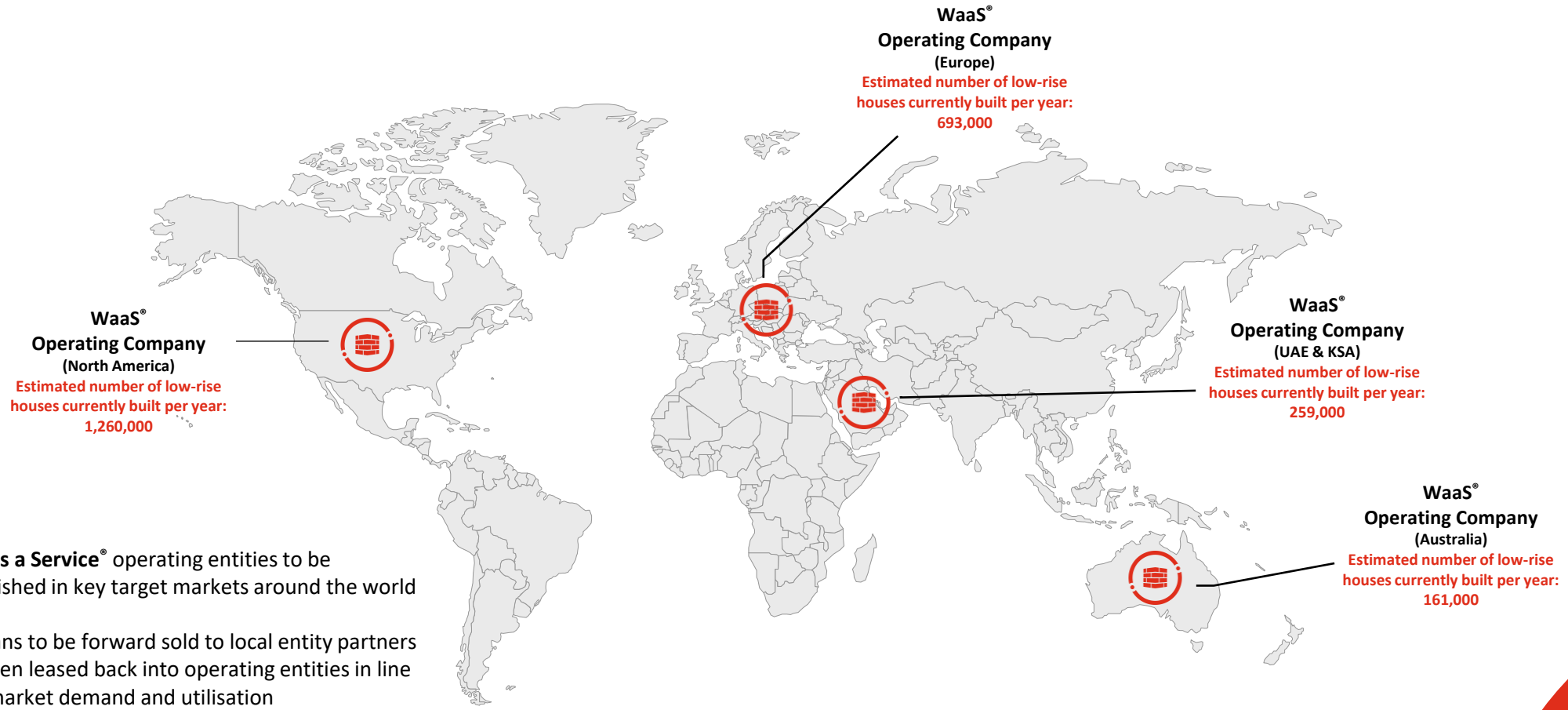
- Mechanical assembly of the first next-generation Hadrian is underway and scheduled for completion at the end of **September 2022**
- Full commissioning expected in **March 2023**
- Next-generation Hadrian targeting lay rate in excess of **500 blocks per hour**
- Handles block types up to 600 x 400 x 300mm (23 standard brick equivalents), 45 kgs
- Speeds of ~120 square metres of wall per hour with largest format block
- Boom reach of 32m, capable of building three storey structures from the road
- Distributed control architecture will give improved reliability
- Deployment time is very quick as most ancillary equipment is stored on the truck
- Interchangeable modules to allow for customisation and quick repair
- Saw module capable of cutting to height and doing mitre cuts and gable cuts
- Completes a standard house in less than a day
- Designed in collaboration with Liebherr-Mischtechnik to be suitable for mass manufacture
- Optimisation programs will now cease on H01 and H02 with work prioritised on next-generation Hadrian
- Next-generation Hadrian will feature a shuttle delivery system capable of laying roof tiles as well, opening a new market for FBR using its existing technology

# Wall as a Service® - commercial model

- **WaaS®** is the servitisation and digitalisation of the old way of selling bricks and manual bricklaying labour separately
- **WaaS®** is sold as a fixed price single delivered service to customers
- The **WaaS®** operating entity supplies the blocks and robotically constructs walls onsite to the precise specification of a digital architectural plan
- **WaaS®** allows customers to directly access the benefits of robotic construction such as improvements in speed, accuracy, safety and waste, without having to build robotics capability into their businesses
- Acquisition of order:
    - Builder requests quote to build walls of house(s) and sends architectural plans to **FBR**, including brick specification
    - **FBR** runs plans through its proprietary architectural software and delivers fixed price lump sum quote for supply and lay of walls to plans specification
    - **FBR** sends fixed price quote to builder, guaranteeing price for 24 months, and provides total estimated build time
    - Builder agrees to quote and requests date for service
    - **FBR** orders bricks from preferred supplier and arranges for delivery direct to site on specified day
    - **FBR** sends **Hadrian X®** to site on appointed day and builds house
    - **FBR** bills for 100% of work



# Potential global demand




- **Wall as a Service®** operating entities to be established in key target markets around the world
- Hadrians to be forward sold to local entity partners and then leased back into operating entities in line with market demand and utilisation
- Selection process for entity partners in key regions has commenced

# Global scaling strategy

- Strategic partners can access equity in local operating entities by purchasing Hadrian X® robots from FBR and supplying those machines to WaaS® operating entities, allowing for rapid, capex-free scaling for FBR
- Operating entity profits for local partners will be invested in growing the fleet of Hadrian X® robots
- Capability of existing prototypes to lay clay, concrete, AAC and calcium silicate demonstrated
- Non-binding term sheet signed for up to 5,000 homes in Mexico with GP Vivienda
- FBR working closely with market leading block supplier to execute US market entry strategy
- MOU with the UAE Ministry of Energy & Infrastructure in place
- Hadrian X® projected to be economically viable for both high and seemingly low labour cost markets
    - Access to low-cost machine operators
    - Higher build volume in greenfields developments
    - Ability to operate the Hadrian X® 24 hours a day, seven days a week
- Software play in developing markets likely to be a long-term benefit
    - FBR will track data from creation of block to placement in a wall according, with applications for builders, home-owners, insurers, aftermarket sellers of household items
- ESG mandates to adopt cleaner construction methods coming into play around the world
- Increased global focus on sovereign labour security due to pandemic
- Liebherr-Mischtechnik positioned to be granted exclusive long term manufacturing rights for Hadrian X®

# Next 12 months for FBR

- Mechanical completion of first next-generation Hadrian by 30 September 2022
- Complete committed builds in pipeline, then reduce build activities until next-generation Hadrian is online
- Full commissioning of first next-generation Hadrian by 31 March 2023
- Second next-generation Hadrian completed
- Obtain binding orders for robots to be sold to appropriate entity partners and then leased back into operating entities
- Complete real-world house using Wienerberger Porotherm blocks
- Establish US entity and complete scheduled demonstrations with assistance from market leading block supplier
- Establish European entity
- Complete International Code Council (ICC) certification of Fastbrick Wall System in the United States currently in progress, followed by Miami Dade County certification for Florida operations
- Further development of BIM architectural software to enable integration into construction design and planning with customers and allow for full handover of software to future partners
- Complete further 3D concrete printing testing to determine whether to license existing technology and platform to gantry-reliant market incumbents or to compete
- Complete roofing robot testing with new shuttle architecture of next-generation Hadrian
- Complete rollout and demonstration of Hadrian capabilities in international markets to commence demonstration to royalties-driven business

# Disclaimer



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