City Chambers
DUNDEE
DD1 3BY

10th September, 2021

TO: ALL MEMBERS OF THE TAY
CITIES REGION JOINT COMMITTEE

Dear Sir/Madam

TAY CITIES REGION JOINT COMMITTEE

Will you please attend a MEETING of the **TAY CITIES REGION JOINT COMMITTEE** on Friday, 17th September, 2021 at 10:00am, to be held remotely.

Please submit any apologies to Veronica Thomson, Committee Services Officer on telephone (01382) 434205 or by e-mail at veronica.thomson@dundeecity.gov.uk.

Members of the Press or Public wishing to join the meeting should contact Veronica Thomson, Committee Services Officer on telephone (01382) 434205 or by e-mail at veronica.thomson@dundeecity.gov.uk by **12 noon on Wednesday, 15th September, 2021**.

Yours faithfully

ROGER MENNIE

Clerk to the Joint Committee

1 WELCOME AND APOLOGIES

2 DECLARATION OF INTEREST

Elected Members are reminded that, in terms of the Councillors Code, it is their responsibility to make decisions about whether to declare an interest in any item on this agenda and whether to take part in any discussions or voting.

This will include all interests, whether or not entered on your Register of Interests, which would reasonably be regarded as so significant that they are likely to prejudice your discussion or decision-making.

3 MINUTE OF MEETING OF 18TH JUNE, 2021 - Page 1

(Copy enclosed).

4 TAY CITIES REGION DEAL

(Update by Mo Saunders, PMO).

5 TAY CITIES REGION DEAL – AUDITED AND UNAUDITED ACCOUNTS - VERBAL UPDATE

(Verbal update by Robert Emmott, S95 Officer).

6 TAY CITIES REGION DEAL – BUSINESS JUSTIFICATION CASE FOR APPROVAL - Page 37

(i) TCD007 5G DIGITAL TESTBEDS

(Report No TCRJC13-2021 enclosed and presented by Gregor Hamilton, Management Group Sponsor Representative and Presentation by Project Leads Rory Young and Julie Craik).

7 TAY CITIES REGION DEAL – PRESENTATION BY PITLOCHRY FESTIVAL THEATRE

(Presentation by Project Lead Kris Bryce, Executive Director of Pitlochry Festival Theatre).

8 TAY CITIES REGION DEAL – CYBERQUARTER UPDATE

(Presentation by Project Lead Lorna Edwards, Head of Business Development, Abertay University).

9 AOCB

10 DATE OF NEXT MEETING

Friday, 9th December, 2021, to be held remotely.

ITEM No …3……..

At a MEETING of the **TAY CITIES REGION JOINT COMMITTEE** held remotely on Friday 18th June, 2021.

Present: -

Angus Council

Councillor Bill DUFF
Councillor David FAIRWEATHER
Councillor Mark SALMOND

Dundee City Council

Councillor John ALEXANDER
Councillor Lynne SHORT
Councillor Richard McCREADY

Fife Council

Councillor David ROSS
Councillor Andy HEER
Councillor Karen MARJORAM

Perth & Kinross Council

Councillor John DUFF

Non-Elected Members

Councillor Andrew PARROTT, TACTRAN
Alison HENDERSON, Dundee and Angus Chamber of Commerce
Nigel SEATON, University of Abertay.

Also Present

Greg COLGAN, Dundee City Council
Robin PRESSWOOD, Dundee City Council
Robert EMMOTT, Dundee City Council
Margo WILLIAMSON, Angus Council
Mark DAVIDSON, Angus Council
Keith WINTER, Fife Council
Mark SPEED, TACTRAN
Barbara RENTON, Perth and Kinross Council
David LITTLEJOHN, Perth and Kinross Council
Ronnie PALIN, Skills Development Scotland
Roger MENNIE, Tay Cities Deal Legal Officer
Steve BELL, Tay Cities Deal Comms
Lorna EDWARDS, cyberQuarter
Graham PINFELD, Rural Angus and Rural Perth and Kinross Highspeed Broadband Project
Alistair MCLEOD, Rural Angus and Rural Perth and Kinross Highspeed Broadband Project

Clare SLATER, Tay Cities Deal Project Manager
Mo SAUNDERS, Tay Cities Deal Programme Manager

Councillor John ALEXANDER, in the Chair.

I APOLOGIES

Apologies had been intimated from Councillor Tim Brett, Cllr Angus Macmillan Douglas, Councillor Murray Lyle, Councillor Grant Laing, Hayley Mearns, Michael Wright, Ellis Watson, Gordon McGuiness, Vivien Smith, Steve Grimmond.

II DECLARATIONS OF INTEREST

There were no Declarations of Interest.

III MINUTE OF MEETING OF 23RD APRIL 2021

The minute of meeting of 23rd April 2021 was submitted and approved.

IV TAY CITIES REGION DEAL UPDATE

A presentation by Programme Manager, Mo Saunders, was given to the Joint Committee outlining the current position with regards to the Tay Cities Region Deal.

The updated Business Cases timetable was tabled, along with a timeline for their submission to the Joint Committee for approval. It was noted that all projects were on schedule for this financial year. It was noted that the skills programme which was scheduled to be tabled in September would outline the governance pathway for these projects also.

In conclusion, an update was given on the Scottish Government Revenue Recovery Fund and the Joint Committee noted that the full £220k claimed had been agreed, with the PMO office currently processing payment to projects. A Regional Recovery Fund template had been developed to support the requirement to report on the Fund, and the PMO would be engaging with projects to meet the submission deadline of 31st August, 2021.

On behalf of the Joint Committee the Chair thanked Ms Saunders for her presentation.

V TAY CITIES REGION DEAL – BUSINESS CASES FOR APPROVAL

(a) TCD013 cyberQuarter

There was submitted Report No TCRJC10-2021 by Robin Presswood, Management Group Sponsor, seeking approval of the Full Business Case (FBC).

A presentation was given to the Joint Committee by Lorna Edwards, cyberQuarter Project lead, Abertay University, to supplement the report, a copy of which is appended to the minute.

The Joint Committee agreed to: -

(i) consider this report, the Executive Summary of the Full Business Case (FBC) at Appendix 2 (a copy of the FBC would be available to the Joint Committee on request);

(ii note that the Management Group had approved the OBC and FBC for TCD013 cyberQuarter on 27th May 2021; and

(iii) approve the FBC.

(b) TCD005 & 006 Rural Angus & Rural Perth & Kinross Digital Projects

There was submitted Report No TCRJC11-2021 by David Littlejohn, Management Group Sponsor, seeking approval of the Full Business Case (FBC) for TCD005 & TCD006 Rural Angus and Rural Perth and Kinross Highspeed Broadband.

A presentation was given to the Joint Committee by Project Leads Graham Pinfield and Alistair McLeod, to supplement the report, a copy of which is appended to the minute.

The Joint Committee agreed to: -

(i) consider this report and the Executive Summary of the FBC (a copy of the FBC would be available to the Joint Committee on request);

(ii) note that the Management Group had approved the Rural Angus and Rural Perth and Kinross Highspeed Broadband (TCD005 and TCD006) on 27th May 2021; and

(iii) approve the FBC.

VI REGIONAL SPATIAL STRATEGY UPDATE AND FUTURE STRATEGY

There was submitted Report No TCRJC08-2021 by Kate Cowey of Angus Council providing an update on the indicative Regional Spatial Strategy, a review of areas where further partnership working could be possible and proposing future governance arrangements for spatial planning in the Tay Cities area.

The Joint Committee agreed to consider the report and :-

(i) note the update on the indicative Regional Spatial Strategy work;

(ii) review and consider opportunities for further partnership working;

(iii) review and consider opportunities for shared governance with the Tayside RSS; and,

(iv) agree the future actions proposed.

VII DATE OF NEXT MEETING

Friday, 17th September, 2021, to be held remotely.

It was noted that the Joint Committee would now revert to the Programmme of quarterly meetings.

John ALEXANDER, Chair.

PMO Update
Joint Committee

18 June 2021

TAYCITIES
Smarter + Fairer

Business Cases with Full OBC Programme and FBC Project Approval

Project Reference and Name	FBC approved by Govts	FBC and OBC Approval by Joint Committee
TCD014 Eden Campus	03/09/2020	21/08/2020
TCD021 Regional Culture and Tourism Investment **Programme**	08/04/2020	19/06/2020
TCD021 (a) Hospitalfield	Not required	17/07/2020
TCD016 Growing the Tay Cities Biomedical Cluster	20/11/2020	19/02/2021
TDC012 Angus **Fund**	24/09/2020	19/02/2021
TCD002 Dundee Airport Investment (Revenue)	12/11/2020	19/02/2021
TCD010 Advanced Plant Growth Centre	10/03/2021	19/03/2021
TCD011 International Barley Hub	10/03/2021	19/03/2021
TCD017 Perth Cultural Transformation (City Hall)	17/02/2021	19/03/2021
TCD021 (b) Discovery Point	Not required	23/04/2021

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Business Case Timetable

Estimated volume expected at each meeting

Key : OBC – Outline Business Case FBC – Full Business Case BJC – Business Justification Case	MG- Consideration by Management Group JC – Decision by Joint Committee * With Governments for review & approval

Project/Programme	June	July (No JC)	Aug (No JC)	Sept	Oct (No JC)	Nov (No JC)	Dec
Year 2 21/22 Projects/Programmes							
TCD002 Dundee Airport Investment **Capital – overarching Programme**				OBC to MG			OBC to JC
TCD005&006 Rural Angus & Rural PKC - High Speed Broadband	FBC to JC						
TCD007 5G Digital Testbeds			BJC to MG	BJC to JC			
TCD008 Low Carbon Transport and Active Travel Hubs	OBC to MG				FBC to MG		FBC to JC
TCD013 cyberQuarter	FBC to JC						
TCD021 Regional Culture & Tourism Investment **Programme**		OBC update MG		OBC update			
TCD021b Dundee Heritage Trust - Discovery Point							
TCD025 Tay Cities Engineering Partnership **Revenue**		OBC to MG	FBC to MG	FBC to JC			
TCD024 Tay Cities Skills and Employability Development Programme **Revenue**			OBC to MG	OBC to JC			
Year 3 22/23 Projects/Programmes							
TCD012 a Centre for Agricultural Sustainable Innovation (CASI) - Angus **Fund** project						OBC to MG	
TCD020 Perth Innovation Highway			OBC to MG				
TCD023 Aviation Academy for Scotland						OBC to MG	

Regional Recovery Fund Update

Headlines:

- Confirmation from the Scottish Government that the full amount of £220k claimed in April has been agreed
- PMO currently processing payments to Projects
- Scottish Government have developed a Regional Recovery Fund template to support the requirement to report on the Fund, as set out in the Grant Offer Letter.
- PMO will be engaging with Projects who received the award to meet the submission deadline of **31 August 2021**

TAYCITIES
Smarter + Fairer

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www.taycities.co.uk

morag.saunders@taycities.co.uk

TAYCITIES
Smarter + Fairer

Abertay University

cyberQuarter

Lorna Edwards, Head of Business Development, Abertay University

18 June 2021

Why it matters

- Bringing together academic researchers and companies to work on cyber security challenges that will led to the creation of new products and services
- Platform for tech businesses to work together and solve existing and emerging problems, supported by some of the best minds in Scottish universities
- Make businesses and citizens more resilient
- Positions Abertay at the heart of a regional response to the global cyber security skills shortage, using the TCD investment to engage with partner colleges, schools and through upskilling/reskilling

Objectives

INCREASE INDUSTRY-ACADEMIA INTERACTION AND COLLABORATION

INCREASE TECHNICAL PROBLEM SOLVING FOR INDUSTRY

INCREASE ACCESS TO CYBER EMPLOYMENT OPPORTUNITIES IN THE AREA

Three elements for investment

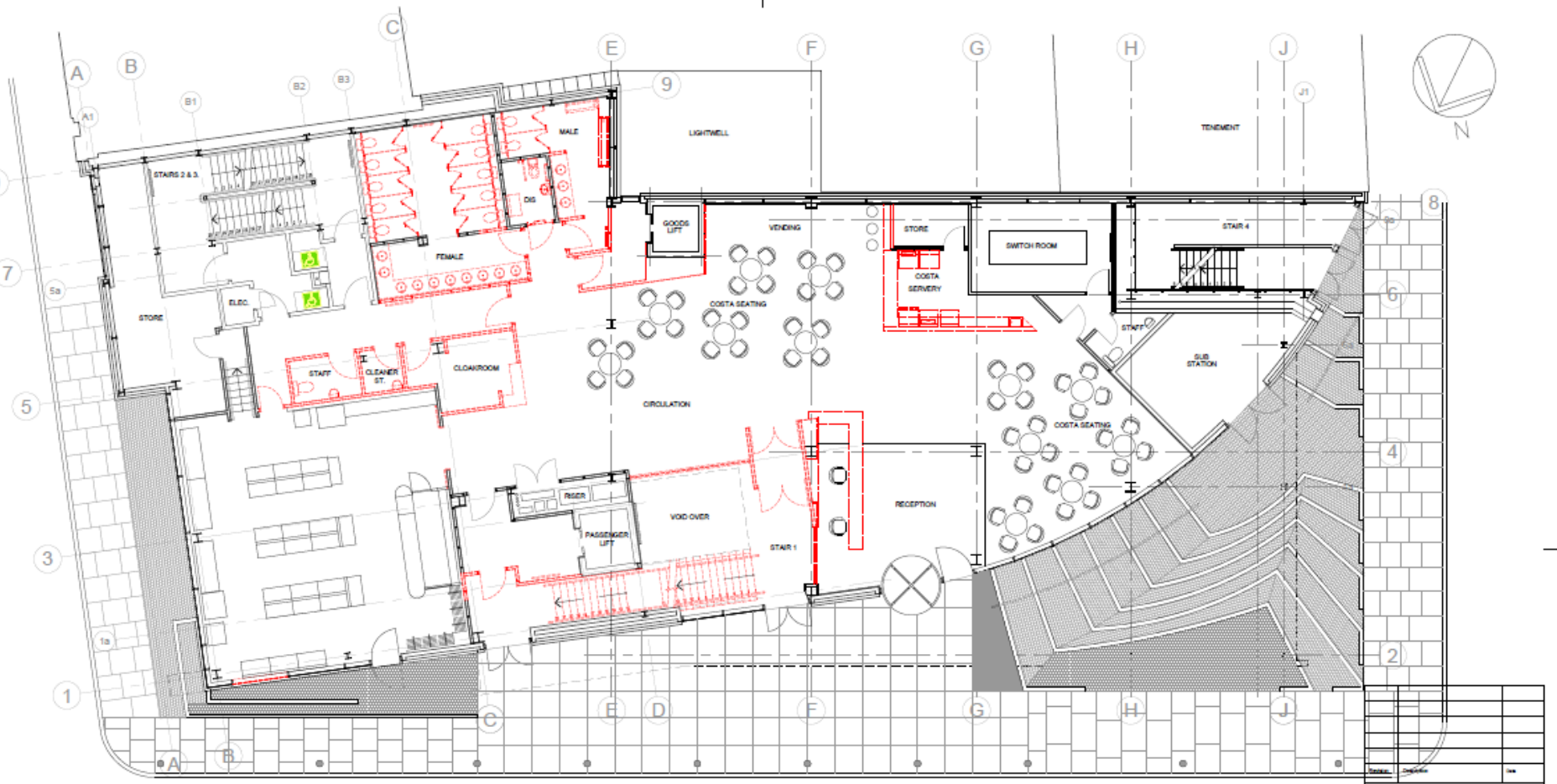
A physical space for collaboration and experimentation using digital tools and technologies

A secure cloud computing infrastructure to enable online teaching and learning, and digital provision of R&D and knowledge exchange activities

A pump priming fund to allow the development of new cyber products, services and education programmes

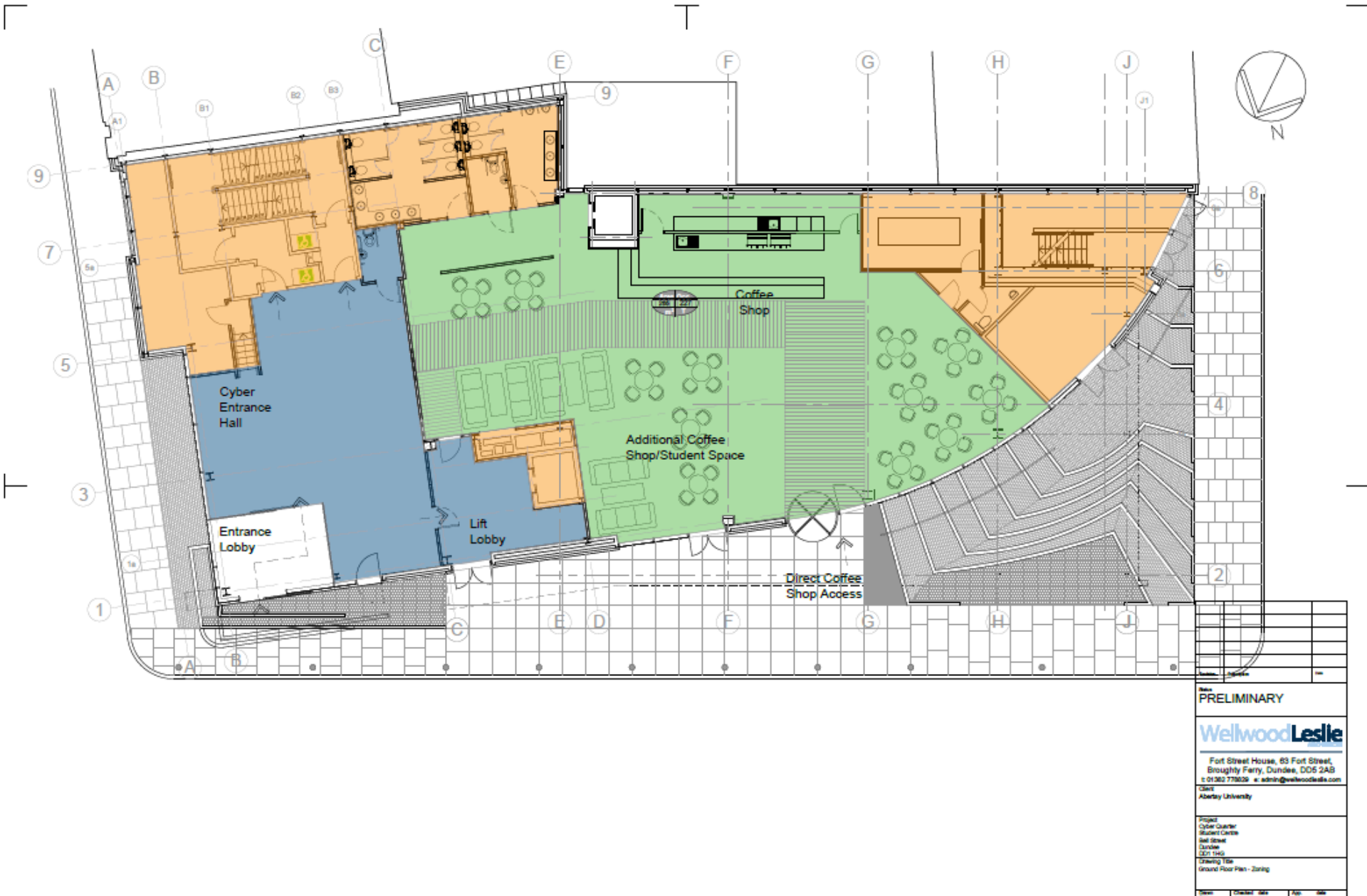
Welcome to the cyberQuarter

Ground floor – current floor plan

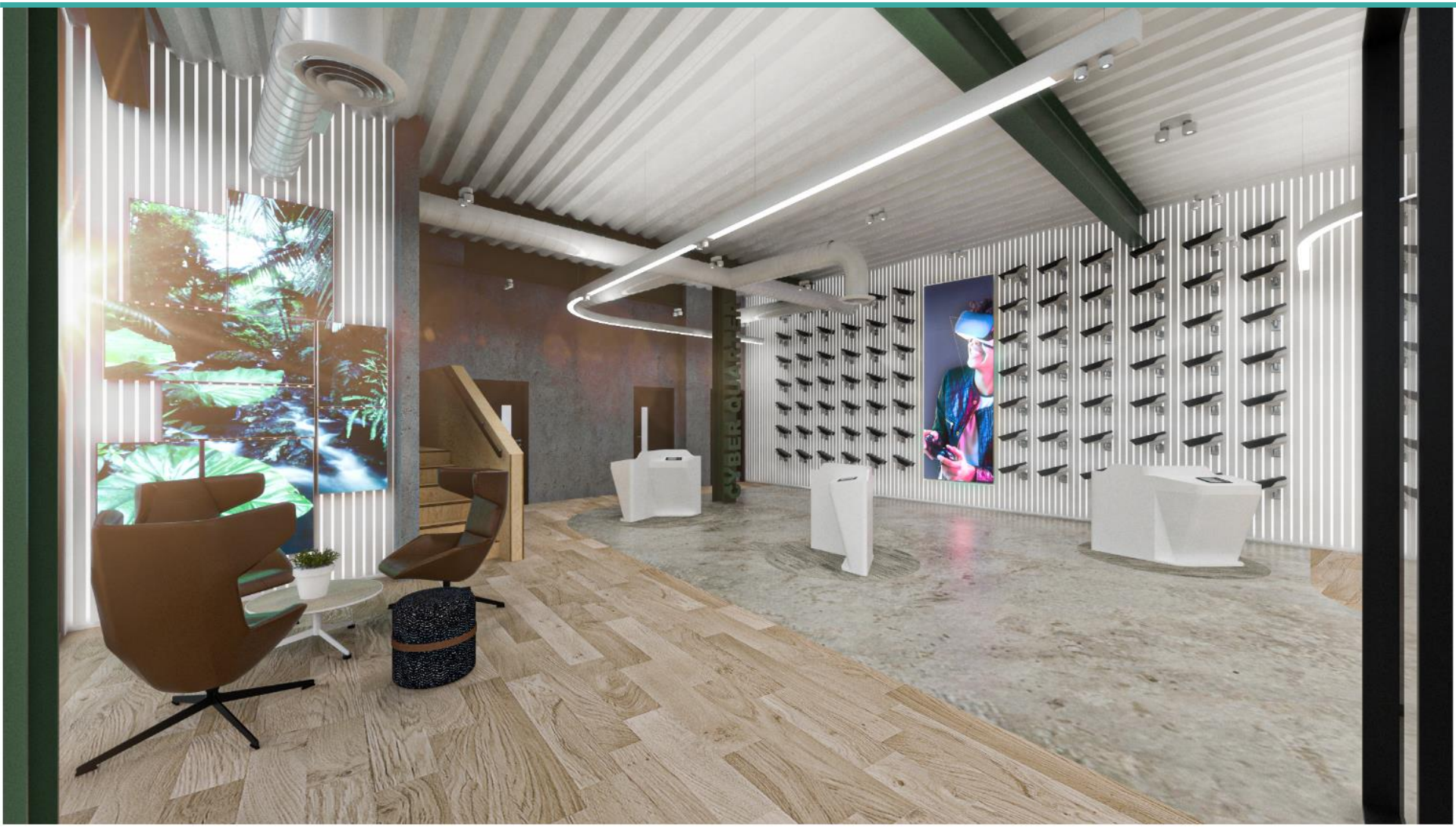


Abertay University

Ground floor - zoning

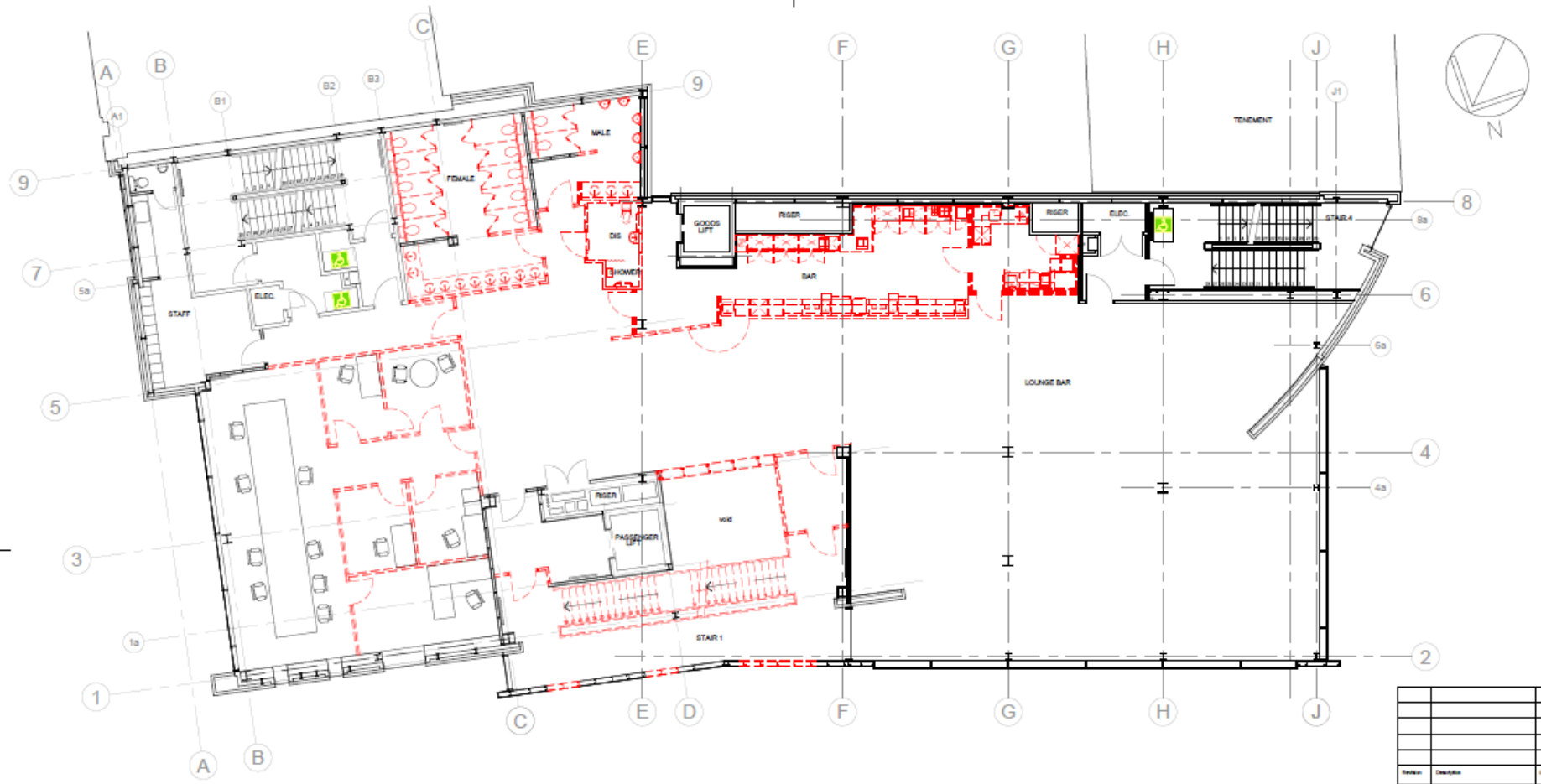


Ground floor – Entrance Hall



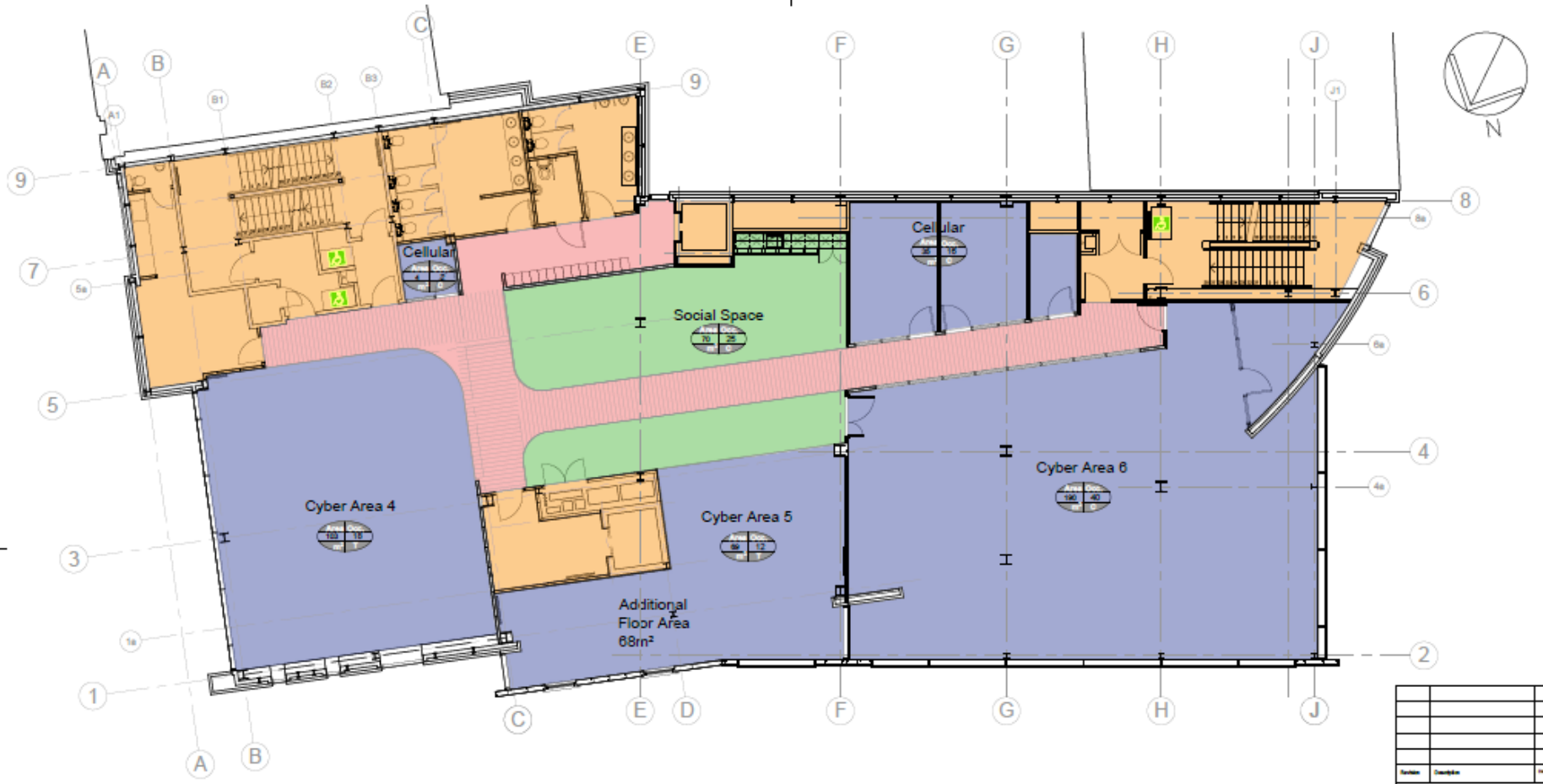
Abertay University

Second floor – current floor plan



Abertay University

Second floor - zoning



PRELIMINARY

WellwoodLeslie

Fort Street House, 63 Fort Street,
Broughty Ferry, Dundee, DD5 2AB
t: 01382 779829 e: admin@wellwoodleslie.com

Client
Abertay University

Project
Cyber Quarter
Student Centre
Bell Street
Dundee
DD1 1HG

Drawing Title
Second Floor Plan - Zoning

Interior views

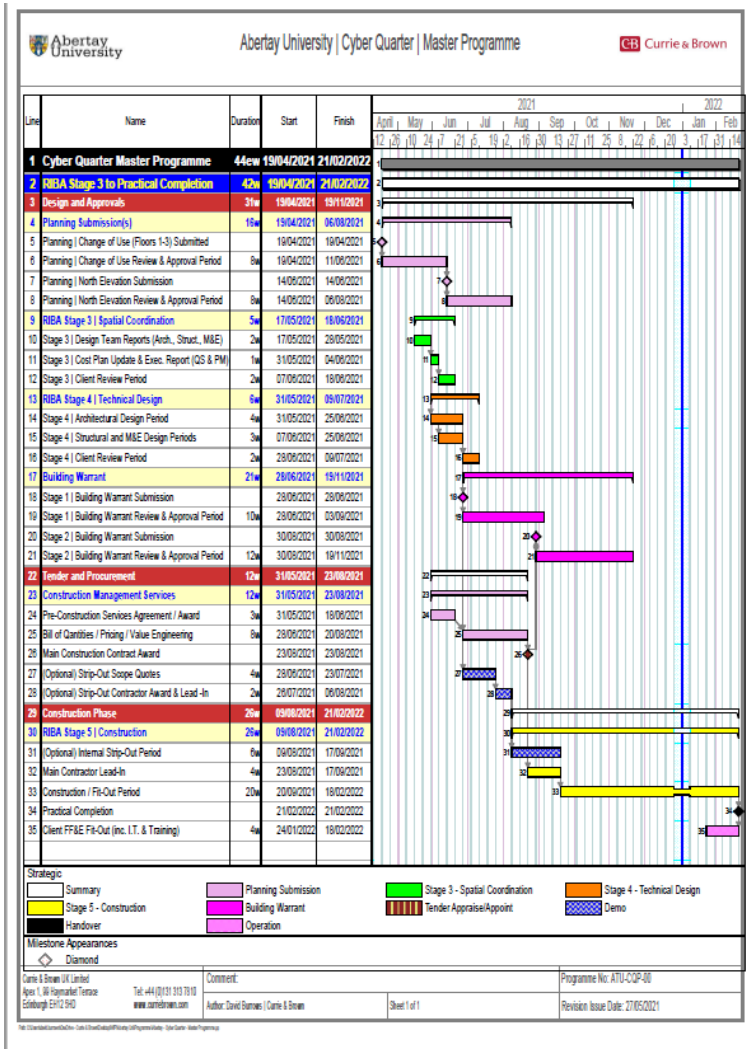
Abertay University

Interior views

Abertay University

Interior views

Delivery



Line	Name	Duration	Start	Finish
1	Cyber Quarter Master Programme	44ew	19/04/2021	21/02/2022
2	RIBA Stage 3 to Practical Completion	42w	19/04/2021	21/02/2022
3	Design and Approvals	31w	19/04/2021	15/11/2021
4	Planning Submission(s)	16w	19/04/2021	06/08/2021
5	Planning | Change of Use (Floors 1-3) Submitted		19/04/2021	19/04/2021
6	Planning | Change of Use Review & Approval Period	8w	19/04/2021	11/06/2021
7	Planning | North Elevation Submission		14/06/2021	14/06/2021
8	Planning | North Elevation Review & Approval Period	8w	14/06/2021	06/08/2021
9	RIBA Stage 3 | Spatial Coordination	5w	17/05/2021	18/06/2021
10	Stage 3 | Design Team Reports (Arch., Struct., M&E)	2w	17/05/2021	28/05/2021
11	Stage 3 | Cost Plan Update & Exec. Report (QS & PM)	1w	31/05/2021	04/06/2021
12	Stage 3 | Client Review Period	2w	07/06/2021	18/06/2021
13	RIBA Stage 4 | Technical Design	6w	31/05/2021	05/07/2021
14	Stage 4 | Architectural Design Period	4w	31/05/2021	25/06/2021
15	Stage 4 | Structural and M&E Design Periods	3w	07/06/2021	25/06/2021
16	Stage 4 | Client Review Period	2w	28/06/2021	09/07/2021
17	Building Warrant	21w	28/06/2021	15/11/2021
18	Stage 1 | Building Warrant Submission		28/06/2021	28/06/2021
19	Stage 1 | Building Warrant Review & Approval Period	10w	28/06/2021	03/09/2021
20	Stage 2 | Building Warrant Submission		30/08/2021	30/08/2021
21	Stage 2 | Building Warrant Review & Approval Period	12w	30/08/2021	19/11/2021
22	Tender and Procurement	12w	31/05/2021	23/08/2021
23	Construction Management Services	12w	31/05/2021	23/08/2021
24	Pre-Construction Services Agreement / Award	3w	31/05/2021	18/06/2021
25	Bill of Quantities / Pricing / Value Engineering	8w	28/06/2021	20/08/2021
26	Main Construction Contract Award		23/08/2021	23/08/2021
27	(Optional) Strip-Out Scope Quotes	4w	28/06/2021	23/07/2021
28	(Optional) Strip-Out Contractor Award & Lead -In	2w	26/07/2021	06/08/2021
29	Construction Phase	26w	09/08/2021	21/02/2022
30	RIBA Stage 5 | Construction	26w	09/08/2021	21/02/2022
31	(Optional) Internal Strip-Out Period	6w	09/08/2021	17/09/2021
32	Main Contractor Lead-In	4w	23/08/2021	17/09/2021
33	Construction / Fit-Out Period	20w	20/09/2021	18/02/2022
34	Practical Completion		21/02/2022	21/02/2022
35	Client FF&E Fit-Out (inc. I.T. & Training)	4w	24/01/2022	18/02/2022

- At RIBA Stage 3/4 – some overlap between stages
- Working with Wellwood Leslie architects and McLaughlin & Harvey as construction partners
- Key dates to note
  - Contractors on site – August 2021
  - Completion date – February 2022

Abertay University

Questions?

Rural Angus and Rural Perth & Kinross High Speed Broadband TCD005 & 006

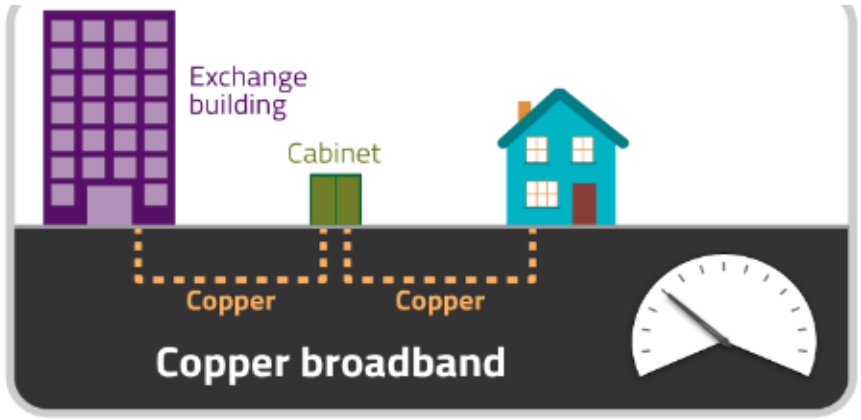
Connected Tay - Tay Cities Deal

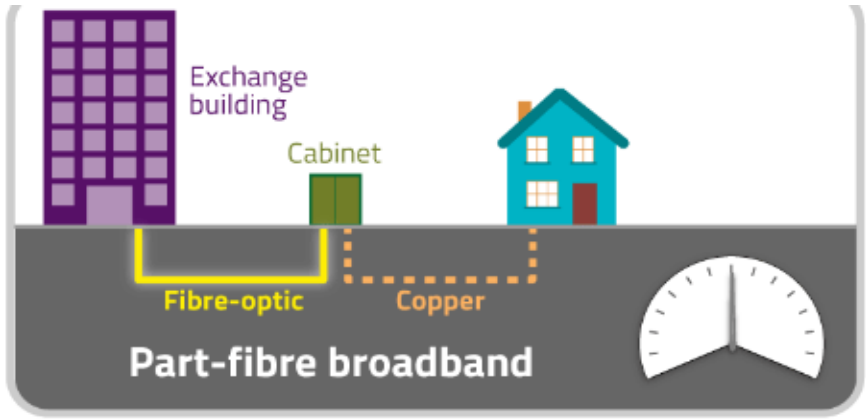
Graham Pinfield/Alistair McLeod

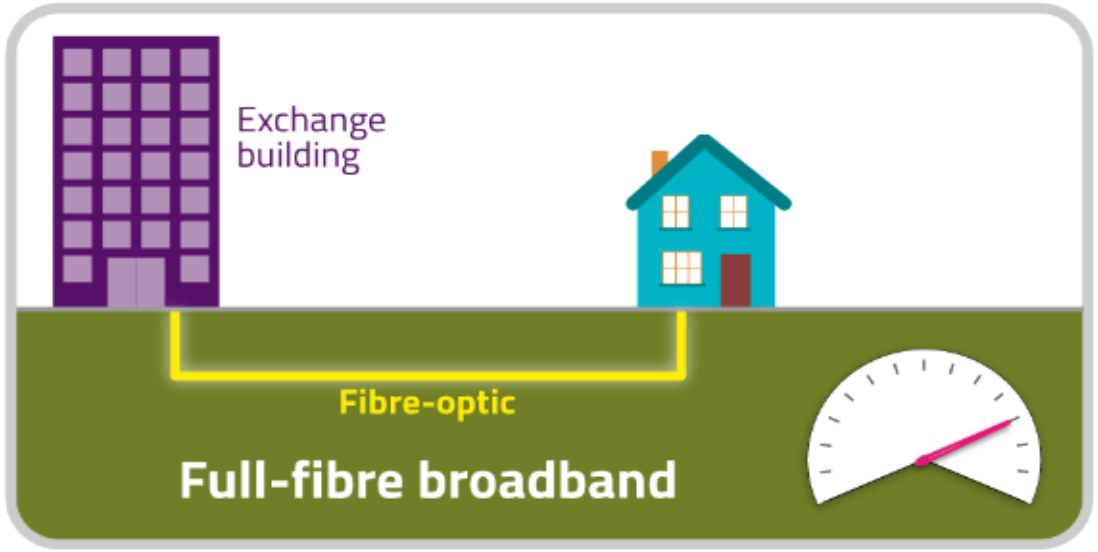
Issues

- Digital connectivity /speeds within rural areas is poor
- Telecoms market failure in rural areas
- Scotland and Tay Cities economy is poorly served by digital
- Rural schools and other community facilities have very poor connectivity
- R100 programme – over 30,000 premises still to be connected in Tay Cities
- Post-Covid-19 requirements for improved digital connectivity

UK aims for full fibre connectivity







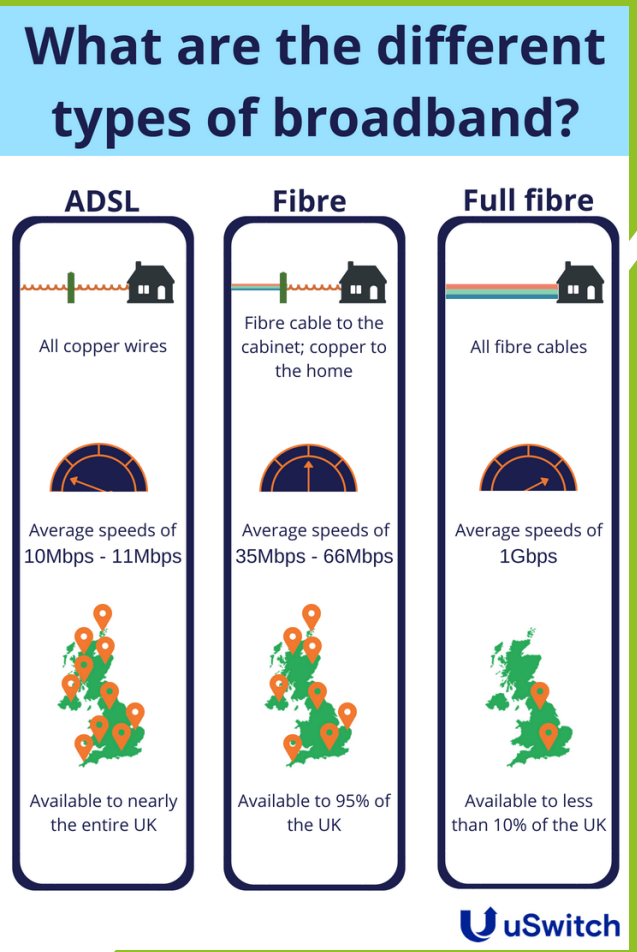
Building a full-fibre future

Full fibre offers far more reliable, consistent and faster connections - with speeds of up to one gigabit per second

Ofcom
making communications work for everyone

Broadband Technology

- Fibre
- Fixed Wireless
- Satellite
- Mobile



The Project

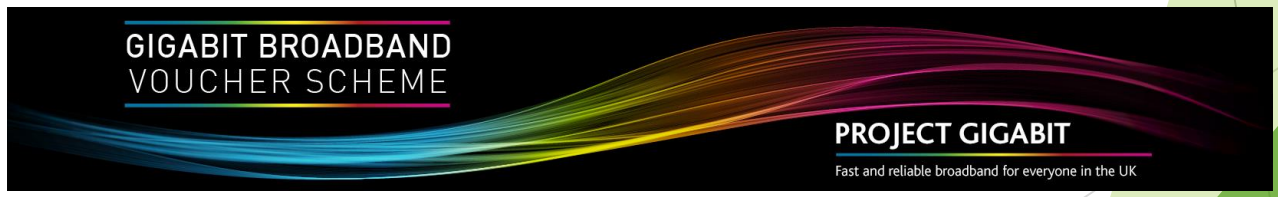
- Angus £1m, P&K £1m
- DCMS LFFN funding £3.9m
- Stimulates commercial providers
  - BT, Virgin Media, City Fibre, Hyperoptic
  - Gigaloch, Gigaclear, WISPs all working across rural Scotland
- Links to other programmes
  - R100 – 100% superfast
  - UK Government £5bn to deliver full fibre connectivity by 2025

Aligning Programmes and Projects

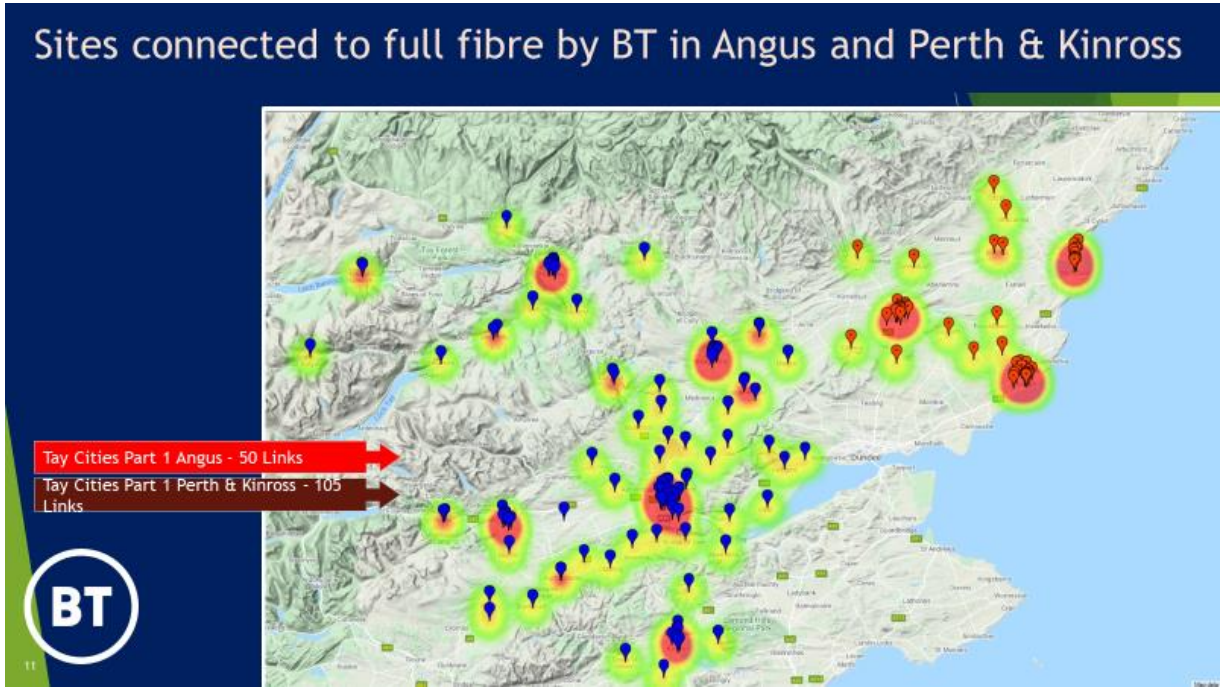
- Digital Scotland Superfast Programme
- R100 Programme
- Broadband Voucher Schemes
  - Gigabit Vouchers/Rural GVs
  - Scottish Broadband Voucher Scheme
  - UK Project Gigabit
- Dundee 5G test bed
- Other TCD projects e.g. CyberQuarter, Perth City Hall etc

Reaching 100% Digital Scotland

Registered supplier to the Scottish Broadband Voucher Scheme

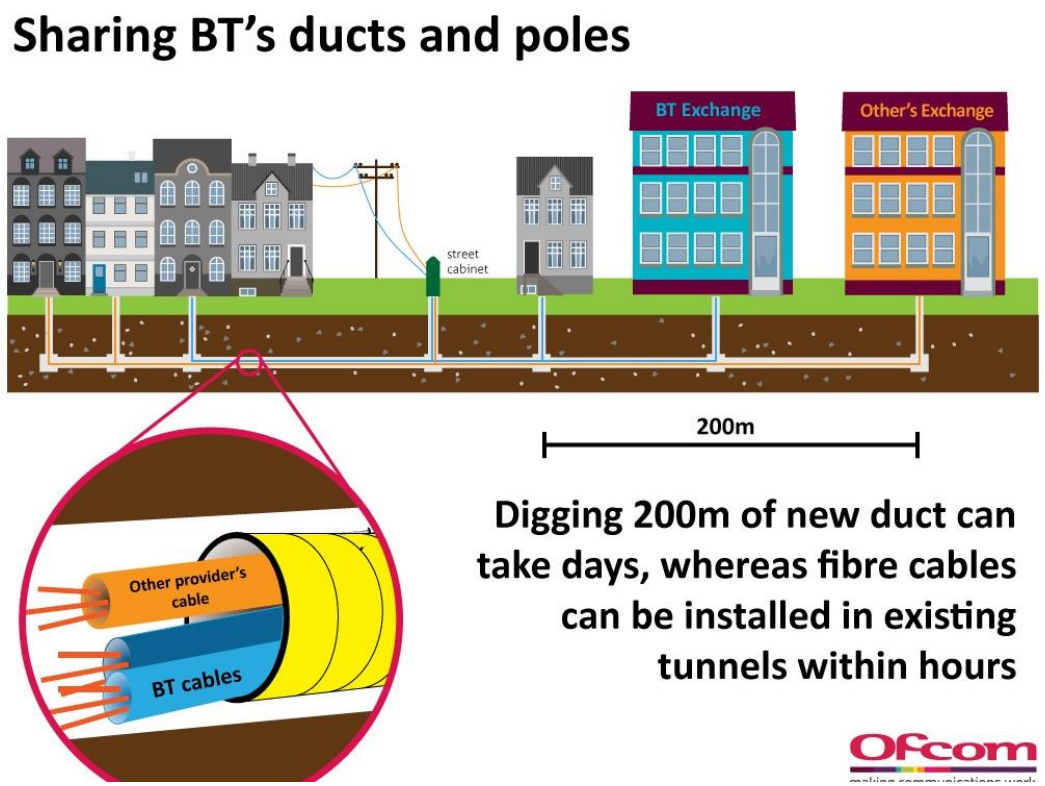


155 rural premises in Angus and P&K



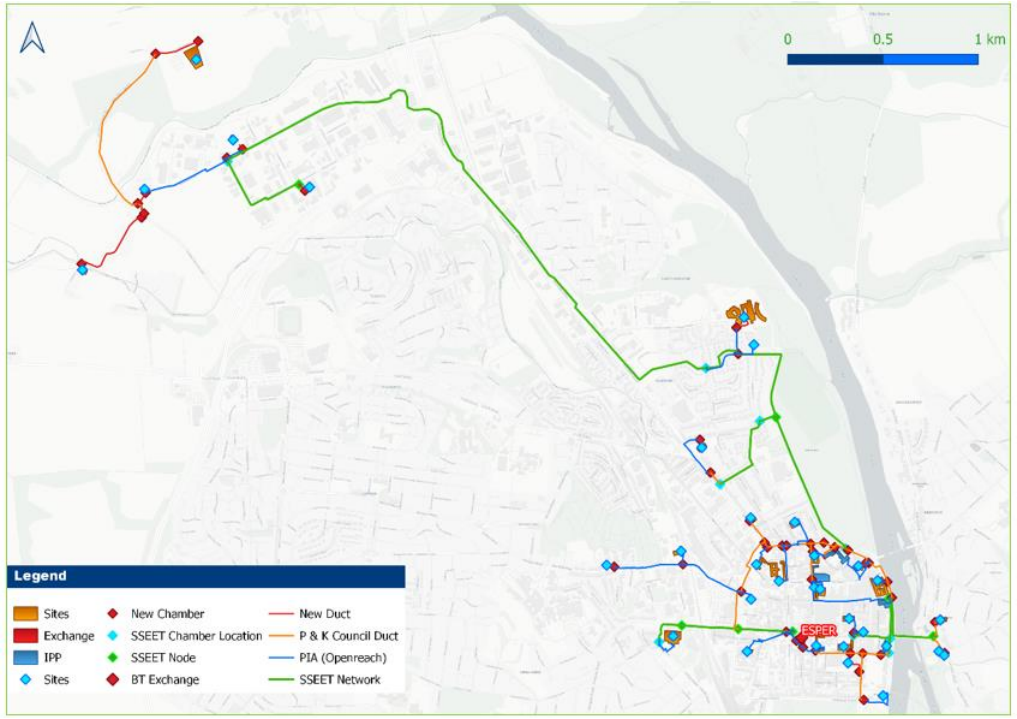
- 52 in Angus, 103 in P&K
- AC £0.5m, PKC £0.53m, DCMS £2.9m
- BT Openreach supplier
- Schools, Community Centres, Council Offices, Libraries, Museums etc
- Delivered in 2 tranches - 30 June and 30 September 2021

BT Full Fibre Infrastructure Build (FFIB)



- Uses Openreach existing network and ducts – minimal digging
- FFIB takes fibre closer to homes and local businesses
- Available to order through existing ISPs (e.g. BT)
- Blends with existing Openreach network

31 premises and renovation/use of duct in Perth

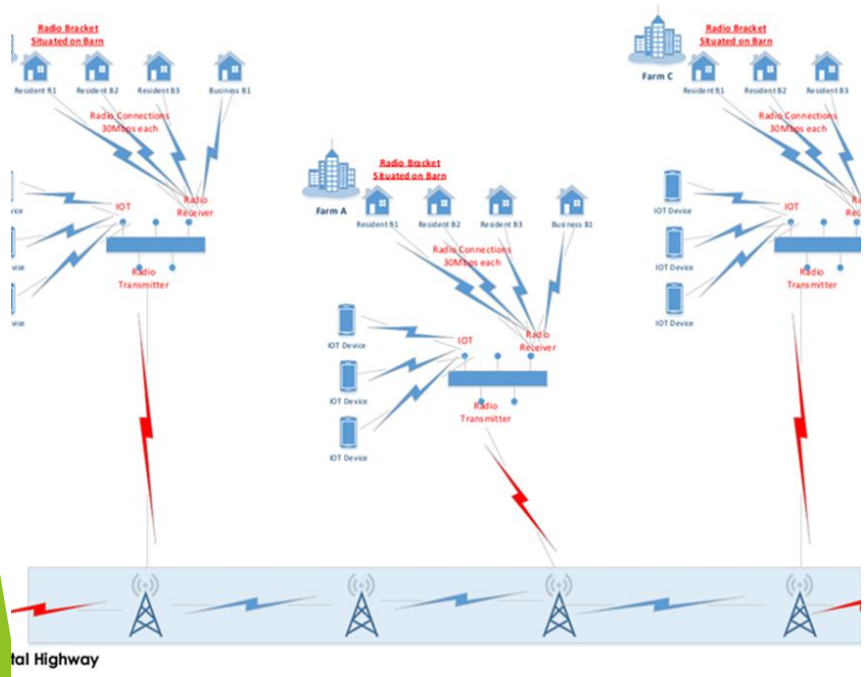


- PKC £0.47m DCMS LFFN funding £1m
- Neos Networks (part of SSE) supplier
- Schools, Offices, Sheltered Housing, Museums and Libraries.
- Uses part of PKC existing duct network and part of SSE fibre network
- Delivered in 3 tranches – March, June, Sept 2021

- 19km network
- 10.4km of existing PKC duct - up to 40% used/renovated
- Reaches Perth West new housing development
- IRUs over use of duct and fibre
- 20 year agreement

Angus Rural Wireless Broadband

- TCD £0.5m
- Wireless Internet Service Providers provide the connection (last mile) from the Core Infrastructure
- Connection Download >=30Mbps
- Core Infrastructure / Open Access / Utilisation of farm buildings / Phased
- SmartRural/ Scottish Agricultural Organisation Society
- Internet of Things network
- 22- 23 Farms with a base station
  - covering 50+ farms



Summary

- Connect 186 Council premises to full fibre gigabit connectivity (155 by BT and 31 by Neos Networks)
- Enables a wireless network for rural/agricultural Angus
- £2m Tay Cities Deal funding leverages £3.9m UK DCMS funding
- Stimulates private sector investment – e.g. City Fibre and Hyperoptic
- £70m+ productivity benefits to Tay Cities economy
- Builds on DSSB programme, links to R100 and Project Gigabit
- Enables other TCD Projects, 5G, IoT, Agritech, Training & Skills and access to Govt broadband voucher schemes
- Excellent example of partnership working

ITEM No …6(i)……..

REPORT TO: **TAY CITIES REGION JOINT COMMITTEE**

REPORT ON: **TCD007 5G DIGITAL TESTBEDS – BUSINESS JUSTIFICATION CASE**

REPORT BY: **EXECUTIVE DIRECTOR – CITY DEVELOPMENT – DUNDEE CITY COUNCIL**

REPORT NO: **TCRJC13-2021**

1. PURPOSE OF REPORT

1.1. This report seeks approval of the Business Justification Case (BJC) for TCD007 5G Digital Testbeds.

2. RECOMMENDATIONS

2.1. The Joint Committee is asked to:

i. Consider this report and the BJC for TCD007 5G Digital Testbeds. (An Executive Summary can be seen at Appendix 2 and the full BJC is available on request via Sharefile)
ii. Note the changes in outputs since deal signing and the rationale for these which are outlined in section 6
iii. Approve the BJC subject to final joint Government approval

3. INTRODUCTION

3.1. This project was awarded up to £2 million in the Heads of Terms Agreement dated 22 November 2018. The Business Justification Case is presented for approval which if granted will enable the project to draw down the allocated funding. The key project information is at Appendix 1.

4. DESCRIPTION OF PROJECT IN THE DEAL DOCUMENT

4.1 The Tay Cities Deal 5G (TCD007 Digital Testbeds) project was awarded up to £2m in the Tay Cities Deal Heads of Terms as part of the Connected Tay – World Class Digital Infrastructure Theme. The Heads of Terms identified the overall aim of the project is to support the development of 5G testbeds and trials in the Tay Cities region, helping to put it at the forefront of 5G deployment. The funding will be used to work with businesses, academic institution and local communities to develop and demonstrate 5G test cases to develop the potential use of 5G and demonstrate the innovation possible, its potential markets and the appeal of these innovations to regional communities and stakeholders.

4.2 **The Project:** Based on a model developed by the Department for Culture, Media and Sport (DCMS) the TCD-5G project will utilise the existing 5G Testbed, built on Dundee's waterfront and other infrastructure to deliver a range of innovative use case trials. These include esports, virtual media production, tourism, smart ports/cities agritech and automation/robotics. The aims of the TCD-5G project mirror those of the DCMS' approach to 5G development and deployment in seeking to foster the development of the city region's 5G ecosystem; build the business case for 5G by stimulating development in new projects/sectors and in leading the way in 5G R&D.

4.3 **TCD-5G Investment:** the project will see up to £2m invested in a number of use case trials, through a pathfinder programme of pre-identified uses and a future challenge fund programme to enable an evolving approach to further/future collaboration based on identified opportunities/need. Dundee City Council will work in partnership with the other Tay Cities Deal local authorities, Scottish Futures Trust, the Scottish 5G Connect Hub, Abertay University and other commercial and academic partners to deliver the programme of use case trials.

4.4 **Proposed outcomes:** the project will deliver a range of outcomes including: productivity growth, digital skills, connectivity improvement and promoting the region and Scotland's innovation credentials. They key outcomes include:

- Deliver between 6 and 12 5G use case trials, depending on scale, through a Pathfinder programme and a Challenge Fund
- Lever in up to £1.2m of funding to match to TCD-5G investment
- 2 events hosted through use case trials to raise awareness of the benefits and opportunities of 5G to future economic needs amongst regional stakeholders
- Publication and dissemination of Use Case trial results to deliver maximum impact, awareness of benefits and applications and stimulate wider application and business development.
- Showcase the region's digital skills, tech-based companies and academic partners
- Support the development of the S5G Connect Hub for the region, in partnership with Scotland's 5G Centre.
- Attract investment to the city region - installation of the testbed has already seen one of the Scottish Government's first 5GConnect Hubs being established in Dundee and 2 inward investment enquiries because of the 5G potential in the city.
- Potential to support research bids and collaborations with the universities of Dundee, St Andrews and Abertay.
- Framework for assessing use case trials developed and implemented
- Project manager/technical expertise recruited to support development of Pathfinder and Challenge Fund approaches
- Board established to support development/use of 5G testbed/uses cases

5. FINANCIAL IMPLICATIONS

5.1 This project is currently profiled to spend up to £2 million capital from the Tay Cities Deal funding. The funding is anticipated to be drawn down as follows:

PROJECT ACTIVITY	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	TOTAL
Project Management	25,000	50,000	50,000	25,000	150,000
Pathfinder Use Cases	425,000	395,000	422,000	58,000	1,300,000
Challenge Fund		275,000	275,000		550,000
TOTAL (Scottish Government Funding through TCD)	450,000	720,000	747,000	83,000	2,000,000
Leverage	270,000	432,000	448,200	49,800	1,200,000

5.2 The project will lever in up to £1.2 million in additional funding and/or value in kind from partners participating in the use case trials.

6 IMPLEMENTATION PLAN

6.1 As a result of changes to the project (becoming a separate project from the Rural Broadband project) the outputs and outcome of the project have changed. The key output of the project is knowledge transfer. In alignment with a report on early use case trials for the UK government Department for Culture, Media and Sport (DCMS), the findings are that use case trials produce knowledge and learning and stimulate business engagement rather than jobs in the immediate terms. The anticipated leverage has been adjusted to reflect the potential grant rate that may be applicable to certain partners, particularly SMEs. However, each use case study will be expected to deliver a degree of leverage – whether financial or value in kind.

6.2 Being driven by a focus on research & development, the main, direct outputs of the project are in alignment with those delivered by the DCMS 5G use case testbeds and trials programme, of delivering learning, knowledge transfer and business relationships that offer potential for innovative products, processes and services to be developed, stimulate demand for and accelerated roll-out of 5G and resulting economic and social impacts. Outputs at the time of the deal signing were inherited from the Rural Broadband project which the project was separated from post Heads of Terms. Jobs and GVA metrics have been replaced with benefits from business collaboration, business opportunities, growth and consequent job creation that might occur as a project identifies the potential for commercialisation.

6.3 Reflecting the separation of the two projects, the following changes to the Implementation Plan are highlighted:

- Jobs - directly created by the project - 0 instead of 20
- GVA - directly created by the project - 0 instead of £116m

6.4. The milestones, outputs and targets, and risks and mitigation set out in the Implementation Plan and reflected in the BJC are set out below.

Milestones

Milestone	Description	Start	Completion
Y1 Pathfinder Use Case Trials	Complete specifications and framework response		Aug 2021
Y1 Pathfinder Use Case Trials	Approved by Project Board		Sep 2021
Y1 Pathfinder Use Case Trials	Delivery	Oct 2021	Mar 2022
Y2 Pathfinder Use Case Trials	Complete specifications and framework response		Jan 2022
Y2 Pathfinder Use Case Trials	Approved by Project Board		Mar 2022
Challenge Fund	Complete specifications		May 2021
Challenge Fund	Project Board to agree number of calls.		Jul 2021
Challenge Fund – Call or Call 1 use case trials	Launch and selection	Oct 2021	Jan 2022
Challenge Fund – Call or Call 1 use case trials	Delivery	Apr 2022	Mar 2023

Y2 Pathfinder Use Case Trials	Delivery		Mar 2023
Y3 Pathfinder Use Case Trials	Complete specifications and framework response		Jun 2022
Y3 Pathfinder Use Case Trials	Approved by Project Board		Aug 2022
Y3 Pathfinder Use Case Trials	Delivery		Mar 2024

Key Project Risks and Mitigations

Risk	Mitigation
Project and Use Case Trial Management: Project Management including management of the technical and technology aspects of use case trials and appropriate testbed and data centre specifications to support trials will be demanding.	Ensuring availability of relevant expertise and technical facilities and mitigation of barriers to testbed build will be a key role of the relevant Project Board: Effective project management is recognised by DCC as being of paramount importance as the project is a new area of operation for the Council. Consequently, plans are being developed to ensure this is a cornerstone of the project.
Technology and Operational Risk	Use case trials will take place across private 5G networks with no public or general access. Access will require to be facilitated by the owner and manager of the initial Dundee testbed and other private testbeds/networks in the region. In addition, each network will be underpinned by appropriate cyber-security measures in consultation with Abertay University and the Scotland 5G Centre. Abertay University is a partner by contract in the initial Dundee testbed.
Physical/Assets – damage / theft	Exterior 5G testbeds, like any asset that is in the public realm, is open to theft or damage. However, the 5G infrastructure being installed for the private Dundee testbed and others in the region is not high profile compared to other street and communications furniture and appliances.

Outcomes and Targets

Targets	Baseline	Target Uplift	Variance	Date	Comment
New/ safeguarded jobs	GAP – N/A as 5G sector is at a very early stage and no data on 5G employment in Tay Cities Region	0 (directly from the project)	-20	N/A	Please see above.
Leverage of other funding through Tay Cities investment	GAP	Up to £1.2m		2026	Use case trials will be delivered by private/public consortia. Leverage will be achieved from the private sector.
Economic benefit (GVA) to Tay Cities region	£0 (5G is only available on an extremely limited basis in Dundee)	0	-£116m This figure was for LFFN and rural broadband. The project was originally part of that project.)	2034	GVA benefits to the region will come from public 5G roll-out rather than directly from the project but in keeping with precedents set by DCMS use case trial programmes, it is key to stimulating public, business and industrial demand, innovation and accelerated roll-out by telecoms companies.
Inclusive growth targets	Addressed in BJC Appendices 1, 2 and 3			2034	Digital/telecoms and technologies enabled by these such as those for entertainment, industry and delivery of public services all offer significant opportunities for inclusion both for employment and end-users.

6.5 It is expected that the rollout and development of 5G connectivity which 5G use case trials may help to catalyse, will generate and stimulate the following mid to longer term impacts for the Tay Cities region across business, institutions and diverse communities:

- Knowledge transfer on engagement with 5G across multiple sectors and verticals to attract potential research and industrial users and policy makers and strengthen the research and innovation landscape in the region and Scotland. The Learning gained from the project will be used to increase knowledge and know-how including through dissemination of findings, leading to the project as a whole impacting on the Tay Cities and Scottish economies by accelerating engagement with 5G and related digital solutions. As a key goal is to show the readiness of 5G in the context of the key strategic sectors being trialled, trials are based on pre-commercial products, processes and services and offer particular scope to enhance these.

- Stimulating creation of jobs attributable to 5G and the wider creative, digital, technology ecosystem exploiting 5G – according to a Deloitte report, 5G will generate between 60,000 and 160,000 jobs so based on the population of the city region within Scotland it is reasonable to assume 10% to 20% of these might happen in the Tay Cities Region
- Economic growth through attracting companies that can benefit from regional expertise and knowledge and 5G research network resources including cloud data and application hosting facilities and generate employment in Tay Cities region – the Deloitte report predicts additional GDP for Scotland of between £6bn and £17bn – again it is assumed that 10% to 20% of this will accrue to the city region. To date Dundee has received 2 inward investment enquiries on the back of the 5G testbed facility being developed.

- Sustainable business growth through companies developing, testing and accelerating delivery of products, applications and innovation including within a closed, managed network environment.

- Growth of talent pool through attraction of skills and engagement with skills development to respond to the opportunities arising from 5G, 5G supply chain and 5G enabled sectors and evidence to support skills development facilities (such as at MSIP).

7. DECISION PATHWAY

7.1 The project has met the decision pathway milestones as set out below. It should be noted that approval from both Governments is still to be secured. If the governments confirm that a further iteration of the BJC is required then the business case will be brought back to the Management Group and Joint Committee at a later date.

Decision pathway milestones and planned timeline			
Stage	**Milestone**	**Planned date**	**Date achieved**
BJC	Submission of BJC (to PMO who forward to Government)		10/09/2021
	Governments' Approval	Estimated September/ October 2021	TBC
	Thematic Board Recommendation	The previous version of the BJC has been considered & approved by email 26th July 2021. Thematic Board recommendation is required for the version of the business	TBC

		case being presented to Joint Committee	
	Management Group Approval/Recommendation	The previous version of the BJC has been considered & approved by the Management Group on 26th August 2021. The Management Group will receive the BJC being circulated to Joint Committee by email for consideration.	TBC
	Joint Committee Approval	On JC September 2021 Agenda	TBC

8. CONDITIONS

8.1 The Thematic Board has not imposed any conditions but has provided a number of suggestions to assist the project in the development of the original OBC and current BJC.

9. POLICY IMPLICATIONS

9.1 This report has been subject to an assessment of any impacts on Equality and Diversity, Fairness and Poverty and Environment. This is addressed at page 9 of the BJC and Appendices 1 to 3. An Equalities Impact Assessment has been completed and can be seen at Appendix 1. The project will address inclusivity across four strands:

- Research, development and deployment of use case trials
- Community and business engagement with use case trials
- Facilitating access to novel, 5G enabled approaches to learning skills
- Raising awareness of career and business pathways relevant to 5G underpinned by STEM skills

9.2 Given that the project must meet capital eligibility requirements, the project is also engaging with the Tay Cities Deal Regional Skills and Employability Development Programme and will pursue opportunities as above.

10 CONSULTATIONS

10.1 The following have approved the presentation of this BJC:

- Local Authority Project Management Officer: Diane Milne / Julie Craik
- Responsible Finance Officer: Paul Thomson
- Management Group Sponsor: Robin Presswood

Robin Presswood
Executive Director of City Development

Author: Diane Milne

9th September 2021

APPENDIX 1

Project Information		
Project number	TCD007	
Project name	5G Digital Testbeds	
Project owner	Julie Craik	
Project Finance Officer	Paul Thomson	
Management Group Sponsor	Robin Presswood	
Award amount under TCD	£2 million	
Jobs: Target number of jobs to be created	0	Please see section 6.5 Variance above
Leverage to be achieved	£1.2 million	

APPENDIX 2

EXECUTIVE SUMMARY (Full BJC available via Sharefile on request)

TCD007 5G Digital Testbeds.

2. EXECUTIVE SUMMARY - TAY CITIES DEAL 5G (TCD-5G)

Introduction
The Tay Cities Deal 5G (TCD-5G) project was awarded up to £2M in the Tay Cities Deal as part of the Connected Tay – World Class Digital Infrastructure Theme. The Signed Deal identified the overall aim of the project is to support the development and deployment of 5G use case trials utilising 5G testbeds in the Tay Cities region, helping to put it at the forefront of 5G deployment.

5G Testbeds: 5G testbeds, such as the one constructed in Dundee's waterfront, are fully functional cellular technology facilities to help develop R&D based solutions for testing as an early real-world deployment and can be used to grow market opportunities by showcasing new applications.

The Project: The TCD-5G project will provide funding and technical support to encourage the development of use case trials utilising the Dundee Slessor Gardens and other Tay Cities Region 5G Testbeds. Based on a model developed by the Department for Culture, Media and Sport (DCMS) the TCD-5G project will primarily utilise the existing 5G Testbed, built on Dundee's waterfront and other facilities to deliver a range of innovative use case trials, enabling real-life projects to demonstrate new, or show the application of, 5G products, processes and services across diverse, strategic priority sectors. The aims of the TCD-5G project mirror those of the DCMS' approach to 5G development and deployment in seeking to foster the development of the city region's 5G ecosystem; build the business case for 5G by stimulating development in new projects/sectors and in leading the way in 5G R&D. The project will help to deliver the ambitions outlined in the Scottish Government's 5G Strategy (2019) and Digital Strategy (2021) and help to position the city region and Scotland at the forefront of 5G technology as its applications develop and advance.

TCD-5G Investment: the project will see up to £2M invested in a number of use case trials, through a pathfinder programme of pre-identified uses and a future challenge fund programme to enable an evolving approach to further/future collaboration based on identified opportunities/need. Dundee City Council will work in partnership with the other Tay Cities Deal local authorities, Scottish Futures Trust, the Scottish 5G Connect Hub, Abertay University and other commercial and academic partners to deliver the programme of use case trials.

Case for Change: Dundee's 5G Testbed, along with digital projects funded by the TCD such as Angus Broadband and Perth & Kinross LFFN in addition to TCD-5G will provide the Tay Cities Region with a step-change in its digital infrastructure so that the current and future needs of businesses, organisations and citizens are comprehensively supported. It will see the roll-out of 5G projects accelerated, giving the region a potential competitive advantage in a range of key sectors and ensuring the region does not lag behind others. Dundee is already an attractive location for the Tech sector. Providing world class digital infrastructure here and across the Tay Cities means that full-fibre and 5G rollout will be faster.

Proposed outcomes: the project will deliver a range of outcomes including productivity growth, digital skills, connectivity improvement and promote the region and Scotland's innovation credentials. They key outcomes include delivery of 6 to 12 5g Use Case Trials, levering in up to £1.2M of funding or Value

in Kind to match the TCD-5G investment and raising awareness of 5G as a tool for delivering enhanced products, processes and services.

Further information on the outcomes can be found in section 4.10 Main Benefits

Project Budget: the TCD-5G project will consist of 3 distinct activities: project and technical management; Pathfinder Use Case Trials and Challenge Fund Use Case Trials.

As an indication the £2M allocated to the TCD-5G project will be used to cover capital funding for:

- **Project management costs**: £150K to cover the costs of technical project management and the sourcing of additional expertise. Officers from Dundee City Council will provide support for project management. Project management will consist of both project coordination and technical project management. Project management of the overall project will be delivered by the Project Manager supported by Dundee City Council and technical support will be provided through collaboration with the Scotland 5G Centre and other expertise as appropriate.
- **Pathfinder Projects**: £1.3M to establish, support and deliver the Pathfinder Use Case Trials and to monitor and evaluation the project's impacts.
- **Challenge Fund**: £550,000 to develop, manage and deliver a Challenge Fund to support additional use case trials.

Up to £1.2M of leverage Is anticipated, with project partners pledging capital funding or value in kind.

Proposed Pathfinder Projects: the proposed pathfinder projects are listed (in summary) below.

Please see further information at Table 3.1 below including engagement consisting of development of use case trials with Consortium partners

Pathfinder	Key Area & Activity	Potential Partners
Virtual Production	Advanced Communications – Media & Games production	Abertay University; Royal Holloway University; Media Production Company, Manchester; global media company; global digital software company
E-Sports/ Playable City	Advanced Communications – using 5G to stream live e-sports events	NLAE; Dundee City Council; Esports Scotland; AWS
Digital Mobility	Automation - Focus on IoT automated, mobile, robotic EV charging of vehicles	Mob Energy, France; Dundee City Council
Digital Tourism	Advanced Communications – using VR/AR to showcase tourism venues and historic locations.	V&A Dundee; Dundee Industrial Heritage;
Digital Play	Advanced Communications – 5G enabled digital play area on Dundee's waterfront	Abertay University; Dundee City Council;
Smart Port and Smart Sites	IoT/Advanced Communications – focus on remote management of sites e.g., port premises and the development of skills.	Angus Council, Montrose Port Authority; 3DEO; Forth Ports; various port tenant companies
Smart Cities	IoT – using sensors/cameras to collect & analyse data in public spaces	Dundee City Council
Agri-Tech	Advanced Communications – using immersive technology for remote engagement with farms & agriculture	James Hutton Institute

3. PROJECT DESCRIPTION

3.1 Introduction

The role of communications and digital technologies has never been more important, the pandemic has brought this into sharp focus. This encourages all local authorities to build on a wide range of strategies developed by the UK and Scottish Governments with a focus on future proofing our digital infrastructure and digital economy. Digital connectivity is key to delivering on the ambitions for the region, which offers particular strengths across the digital, creative and technology sectors, both for products and services and as enablers for the region's other sectoral strengths.

The TCD-5G project focuses on one key aspect of that digital future – the use of 5G technology to build new products, processes and services that encourage economic growth, address social challenges and provide new opportunities for all citizens.

3.2 Dundee and the Tay Cities Region – A Profile

This overview of the region sets the scene for the policy context and outlines the challenges and opportunities facing the region. This includes key ambitions for the Tay Cities Region in the delivery of inclusive growth, boosting productivity and creating world class connectivity fit for the 21st century.

The Tay Cities Region is a diverse economy comprising of the council areas of Angus, Dundee, Fife and Perth & Kinross and incorporating the cities of Dundee and Perth. Significant economic potential is built around 3 world class universities with over 30,000 students, producing 7000 graduates a year, contemporary colleges with 54,000 students and over 15,000 innovative businesses across diverse sectors from digital to construction and tourism to food and drink. The number of businesses continues to grow, attracted by the skills base, the lower costs of business space, cost of living and the quality of life on offer.

The Tay Cities region has a population of almost 790,000 people, larger than Edinburgh and Glasgow, including a working age population (16-64) of almost 500,000. By 2026, the population is estimated to have grown by just over 2%.

The Tay Cities Region has many drivers of ambition. These include:

- Ensuring inclusive growth with an economy that embraces diversity, nurtures talent and capitalises on the youthful population of cities like Dundee;
- Developing transport links and digital connectivity
- A thriving digital and tech cluster that is a trailblazer for technological innovation and change
- A clear focus on future ready skills in its universities and colleges and over 2500 STEAM graduates a year

Fostering key future growth sectors across areas such as digital services, life sciences/health tech, engineering and design, the region is well-placed to enable a new wave of knowledge-based businesses and the TCD-5G project can help to drive this.

3.3 What is 5G – The opportunity/Business Needs

5G is the next generation, or 5th generation of mobile communications and offers more than just faster mobile communication - 5G will utilise entirely new technologies than previous mobile networks and will generate completely new applications and services that will spill over into every facet of our lives and environment. Potentially 5G offers significantly faster, more reliable and increased capacity across the network. 5G can handle applications that require greater bandwidth in a wireless setting such as virtual and augmented reality. It can also support the management of immense data sets such as those generated by Internet of Things (IoT) sensors and cameras to inform business intelligence, decisions

and actions which could improve many aspects of daily life. Lower latency (e.g., minimal delay on transferring data) afforded by 5G means instant or virtually instant response times and therefore the possibility of real time interaction with higher resolution media, visualization, data transmission and artificial intelligence (AI).

Delivering future ready infrastructure such as the testbed and the installation of full fibre to premises (currently being rolled out across Dundee by City Fibre) and the installation of superfast broadband across Perth & Kinross and Angus as part of the TCD Rural Broadband Project will pump prime and lay the groundwork for the roll out of 5G mobile technology. The CD-5G and associated private sector investment will allow this to happen faster than would otherwise be the case.

The development of a 5G testbed and associated use case trials will ensure that businesses, innovators, research institutes, investors and citizens across the region have a greater understanding of the opportunities 5G will bring and are ready to take advantage of the full 5G roll out as it develops. Support from the Tay Cities Deal will allow this to happen faster than would otherwise be the case – providing a competitive advantage in the early stages of 5G technology, roll out and delivery.

At a national level a report by Deloitte for the Scottish Futures Trust (August 2019) highlights the potential impacts of 5G, including economic impacts by 2035 of £17BN in GDP, 160,000 additional jobs and 3000 new businesses. A report by Skills Development Scotland (October 2019) confirmed that the tech sector was one of the fastest growing, contributing £4.9BN to the Scottish economy and supporting almost 100,000 jobs. It also forecast that "the tech sector will be the second fastest growing sector in Scotland between now and 2029, beaten only by childcare services, and is expected to grow one and half times faster than the economy overall."

3.4 What is TCD-5G – The Opportunity/Business Needs

TCD-5G is about capitalising on the new test bed built in Dundee's central waterfront by building on the model developed by the Department of Culture, Media and Sport (DCMS) as part of their 5G Test Bed and Trials programme which seeks to accelerate the deployment of 5G networks, ensuring that the UK can take early advantage of the applications these networks can enable whilst maximizing the productivity and efficiency benefits to the UK of 5G. This approach sees the implementation of a number of use case trials to drive the UK's engagement in 5G. To date they have over 140 use case trials accelerating 5G adoption in targeted sectors, including agriculture, utilities, automotive, transport and logistics.

The TCD-5G project will utilise the use case models approach to engage with the city region's key sectors and that offer applications and innovations for the Tay Cities region, Scotland and the UK. This will leverage the region's strengths across the creative, digital and technology sectors such as software development, games and cybersecurity and the sectors which these are enabling including life sciences, energy and tourism and grow our track record of innovation. The ambition of the TCD-5G project is to deliver a globally competitive offer encompassing diverse applications for these sectors and use cases that build on opportunities in 5G for areas such as entertainment, immersive experiences, advanced manufacturing and the Internet of Things (IoT).

TCD-5G will play a key role in the region's future digital economy by putting the city on the testbed and trials map in Scotland, the UK and globally. The project will use this opportunity to lay the foundations for embracing 5G as part of the region's digital infrastructure and developing a workforce that is industry ready for disruption from new technologies and helping communities to fully engage with the digital economy.

Case for Change: Dundee's 5G Testbed, along with digital projects funded by the TCD such as TCD-5G and TCD Rural Broadband will provide the Tay Cities Region with a step-change in its digital infrastructure so that the current and future needs of businesses, organisations and citizens are comprehensively supported. It will see the roll-out of 5G projects accelerated, giving the region a potential competitive advantage in a range of key sectors and ensuring the region does not lag behind others. Dundee is already an attractive location for the Tech sector. Providing world class digital infrastructure here and across the Tay Cities means that full-fibre and 5G rollout will be faster.

Global internet traffic and the use of data is growing exponentially and the UK's digital infrastructure must be able to support this rapid increase in traffic, providing coverage with sufficient capacity to ensure that data can flow at the volume, speed and reliability required to meet the demands of modern living. Improved connectivity also increases innovation and productivity across the economy, bringing significant economic rewards. The value of enhanced broadband speeds has been calculated at as much as £17B by 2024. (UK Government Digital Strategy 2017). The installation of 5G and full fibre capacity through the TCD Rural Broadband Project (delivering super-fast broadband in Perth & Kinross and Angus) and the TCD-5G project will see a step-change in the potential for the Tay Cities Region. Supporting regional businesses to develop new 5G products, processes and services early, will ensure competitive advantage going forward.

3.5 TCD-5G: Dundee Test Bed

In 2016 Dundee City Council secured funding through their Growth Accelerator Model programme to develop digital connectivity in the central waterfront area. The focus of this is investment in a 5G Testbed, back-office support from Abertay University and associated free public wi-fi in the city's central waterfront, that will be a focus of the TCD-5G project along with 5G facilities in the city region.

The funding provided for the installation of the infrastructure required to support the development of the test bed, working in partnership with Abertay University and the Scottish Futures Trust to develop the test bed and its use.

The TCD-5G project will initially be based on the testbed in Dundee which incorporates, not only the waterfront testbed but also a co-located edge datacentre at Abertay University (key partners in the testbed and the TCD-5G project). The network will include 4G and 5G New Radio, non-3GPP mmWave and Wi-fi radio access technologies in addition to key 5G core elements such as Mobile Edge Computing, Network Function Virtualisation and Network Slicing. There is the potential to look at utilising the planned testbed in Angus through pursuing all opportunities for collaboration and the exploration of urban and rural challenges and opportunities.

The digital infrastructure will incorporate fibre/backhaul between the radio/5G cell sites and the co-located edge data centre, in addition to the power supply to radio sites and other equipment. The data centre will host core network equipment, network operations and monitoring systems and an internet point of presence/gateway. The data centre will be a key focus and platform for testbed customer applications/use cases and act as a service gateway connecting client and partner networks with the testbed.

The telecommunications layer will comprise the:

- Core network and related software providing the high-capacity communication facilities connecting the primary nodes/network connection points
- Wired networking equipment such as network switches and routers
- Wireless networking equipment being 5G small cells and macro-cells
- Wi-Fi Access Points (APs) and fixed wireless connectivity
- Network entities/functions serving the testbed.

- Edge computing

The testbed will also facilitate network access to AI-driven solutions that optimise Access, Transport, Core, Cloud, Edge and Fog resources.

Trials will be executed using technology enablers to support automation as far as possible including cross-domain service orchestrators that enable multi-domain slicing, smart output/indicator visualisation close to real-time analysis, presentation, benchmarking and performance measurement and intent-based APIs to stimulate innovation by and development of new commercial applications.

3.6 TCD-5G Governance and Delivery Model

Governance Approach: Work has been on-going to develop the governance and delivery model and management structure of the use case trials, including prioritisation of the Pathfinder projects and the development of a Framework to ensure appropriate scrutiny and decision making.

Governance: is organised according to the following hierarchy and assumes oversight by the TCD Joint and Management Committees:

- Project Board – consisting of representatives of TCD partner councils, Abertay University. The Scottish Futures Trust and the Scotland 5G Centre exercising oversight of the project.
- Executive Sponsor – fulfilled by the Executive Director of DCC City Development to champion the project
- Senior Responsible Owner – fulfilled by a representative of DCC
- Project Management Team – will report to the Project Board and have responsibilities including project coordination, infrastructure management, technical delivery, reporting and risk management.

Further information is included under Section 8, Governance and Delivery Arrangements.

Approach to Delivery: The greatest benefits of 5G will be delivered when key sectors work together and applications are developed that service multiple sectors – "verticals" – where companies use skills and technology from a range of sectors to deliver innovation. The TCD-5G project aims to support this integration and convergence through the delivery of use case trials - through a number of pre-identified Pathfinder Use Case Trials and a 5G Challenge Fund that will ensure a flexible approach to this evolving technology and potential use cases

This programme seeks to harness the use of 5G technology in sectors where the UK has a competitive advantage. The DCMS chose to develop a use case trials approach as it:

- allows for piloting ways of addressing deployment and technical challenges that will help to establish the conditions under which 5G can be deployed;
- provides environments where UK businesses, including SMES, can test and develop 5G applications, services and products;
- stimulates the development of a strong pipeline of trials from many different future 5G users, learning lessons and driving productivity while helping to build the 5G ecosystem; and
- contributes to economic development in local economies across both urban and rural areas.

It is for these reasons that the TCD-5G project has also chosen to deliver a use case trials-based approach to implementing early stage 5G projects.

Delivery Model: The TCD-5G programme will invest upwards of £1.8M in the development of a range of use case trials, using 2 distinct approaches:

- Pathfinder Use Case Trials: working with consortium of partners to develop use cases in identified sectors such as e-sports, digital tourism and smart ports.
- Challenge Funds: promoting opportunities for organisations to bid in for funding to support 5G cases in chosen sectors or as an open call to encourage innovative ideas for 5G use

Extensive research has been conducted on UK and global 5G use case trial programmes to inform best practice in development, preliminary/lab-based testing, deployment and delivery.

The proposed annual budget for the project Is as follows:

Table 3.1 – Projected Expenditure and Leverage

PROJECT ACTIVITY	2021/22	2022/23	2023/24	024/25	**TOTAL**
Project Management	25,000	50,000	50,000	25,000	150,000
Pathfinder Use Cases	425,000	395,000	422,000	58,000	1,300,000
Challenge Fund		275,000	275,000		550,000
TOTAL	450,000	720,000	747,000	83,000	2,000,000
Leverage (ViK)	270,000	432,000	448,200	49,800	1,200,000

Selection of Pathfinder Use Case Trials: Research was conducted by Dundee City Council in consultation with a wide range of stakeholders across business, academia and the third sector and on behalf of Scottish Futures Trust on sectors of strategic significance for the region to identify Pathfinders and potential partners. As part of formulating and developing Pathfinders, there was an extensive programme of engagement to identify organisations with capacity and interest to engage in the project.

The following potential pathfinder trials are being developed across three key areas: enhanced and advanced communications, Internet of Things and automation (first 3 are priorities for Y1):

Table 3.2 – Pathfinder Use Case Trials

Pathfinder	**Key Area**	**Overview**	**Vertical Sectors**	**Development/Engagement**
Virtual Production	Advanced Communications	With a focus on media and games production and the convergence between the 2 sectors. The trial aims to deliver a cost-effective, efficient and innovative virtual production process capitalising on the use of 5G through a collaboration between production and games companies – focusing on games production technology and screen pre-production, filming and post-production processes.	Entertainment Economy	Abertay University; Royal Holloway University; Media Production Company, Manchester; global media company; global digital software company
E-Sports/ Playable City	Advanced Communications	Use case trial with a focus on e-sports and games and the use of 5G in streaming events playing into Dundee's strong computer games credentials. This will deliver transferable processes and services demonstrating the potential of 5G to facilitate greater efficiencies in delivery and cost-savings on enabling technology.	Entertainment Tourism Education	NLAE; Dundee City Council; Esports Scotland; AWS
Digital Mobility	Automation	Focus on IoT automated, mobile, robotic EV charging of vehicles	Transportation Logistics	Mob Energy, France; Dundee City Council

Digital Tourism	Advanced Communications	Using VR/AR to showcase tourism venues and historic Dundee, educating on design, culture and heritage. Focus on V&A Dundee & Discovery Point in vicinity of testbed and other attractions in the wider TCD region, developing immersive experiences to showcase visitor attractions and activities. There is significant commercialisation potential for this type of application	Visitor Economy Tourism Education	V&A Dundee; Dundee Industrial Heritage;
Digital Play	Advanced Communications	Development of a new digital playpark in Waterfront Place as a focus for a use case on digital play and engaging young people and children to engage with new ways of learning.	Entertainment Education	Abertay University; Dundee City Council;
Smart Port and Smart Sites	IoT/Advanced Communications	Using AR/VR to enhance port experience and in the remote management of sites e.g., industrial premises management and the development of skills. Initial elements will work with Dundee and Montrose ports and other manufacturing sites to demonstrate efficiencies that can be achieved through a range of environmental and process monitoring and the use of immersive technology for skills training and service delivery.	Transportation Construction Tourism Skills	Angus Council, Montrose Port Authority; 3DEO; Forth Ports; various port tenant companies
Smart Cities	IoT	Using IoT sensors/cameras in public places to monitor, measure, collect & analyse data, identifying potential efficiencies/improvements in areas such as environmental conditions, traffic management, parking.	Transportation Tourism Public Realm Public Services Safety	Dundee City Council
Agri-Tech	Advanced Communications	Using immersive for remote engagement with farms and agriculture and the development of transferable skills and services with commercial potential.	Rural Food production	James Hutton Institute

The project timeline for this work is shown at Table 8.1. An evaluation plan will be in place prior to start of delivery of Year 1 Use Case trials. This will be informed by Deal-wide Benefits Realisation work and associated guidance provided by the Scottish and UK Governments including to the TCD PMO in 2020.

Challenge Fund: alongside the development of Pathfinder use cases, TCD-5G will develop and deliver a challenge fund for delivery in both 2022/23 and 2023/24, totaling £550,000. This will support the development of up to 6 more use case trials which address key strategic priorities for the region. It is hoped that the rapid deployment of some of the pathfinder use cases will demonstrate the potential of the testbed and promote its use to other interested parties – stimulating interest in the challenge funds.

Leveraged Investment: up to £1.2M. This is based on grant funding of 60% from TCD-5G investment with consequent match which is anticipated to be largely Value in Kind including staff time, equipment and other resources and external expertise provided through Consortia partners. Reference is made to Table 3.2 – Overview of Pathfinder Use Case Trials as above.

Objectives: the key objective is to fully demonstrate 5G technologies through the selected Pathfinder and Challenge Fund use case trials that can be commercialised at large scale and highlight the potential for 5G to respond to concurrent or conflicting demands and diverse outcomes on the same infrastructure. Engaging with local companies, academic partners and international, national and regional digital and technology companies will ensure this objective can be achieved.

Evaluation: TCD-5G will devise a full evaluation plan to examine the outcomes and viability of the use cases selected for the trials, addressing factors such as:

- Technical performance as evidence by network service and application output;
- Business potential;
- Economic impact, including projected markets and revenues;
- The benefits and impacts of the individual trials on the social, equalities and inclusive agenda;
- User satisfaction in terms of both business intermediaries and end-user markets.

Each use case will also be required to develop an evaluation plan and ensure that outputs/outcomes for each use case trial relate to the overall project's aims, outputs and outcomes.

Marketing, Promotion and Dissemination: Key to the development of a successful use case trials model (and in particular the Challenge Fund element) is the marketing and promotion of the benefits and potential of 5G and the opportunities available at the Dundee Testbed through the TCD-5G project.

Working with key partners (Abertay University, Scottish Futures Trust and the SG5G Connect Hub to develop a marketing, communications and dissemination strategy for the development of 5G in the city, which includes the TCD-5G project. The strategy will ensure that experts, stakeholders and the public aware of the project – it's opportunities, activities and impacts.

The dissemination of the findings of each use case trial and the programme as a whole is another high priority of the project along with finalising an impact report that also considers the relevance of outcomes for social and economic trends as 5G evolves. Al partners and participants will contribute to the dissemination activities via the most appropriate routes for their sector or technology. For example, academic partners and research institutes are expected to prioritise journal publications and conference presentations, while it is anticipated that industrial partners will focus more on communications with media, potential users and stakeholders.