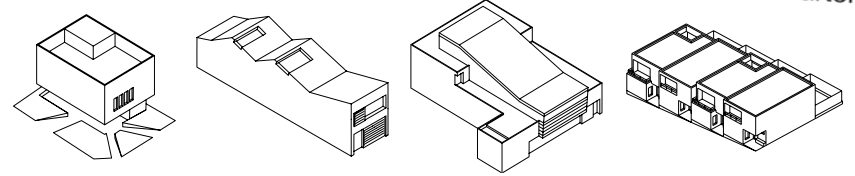


>> TRACEABILITY

WHERE, WHAT, HOW, WHO.... WHY



>> MEDIOMUNDO In collaboration with Catherine Duncalfe and Philip Etchells



INTRODUCTION

Where/What/How/Who and Why, is an investigation into the production and use of the built environment. Here the investigation begins by exploring the environmental impact of the construction process, using as case studies the following four building projects carried out by our practice. The aim of looking at these buildings is to explore **who** contributed to each project, **what** they do, **where** they came from, **how** long they spent on site and most importantly **how** far they had to travel? By creating a means to compare and analyse these parameters we hope to gain a clearer understanding of the initial production of each project and their environmental impact.

This first reflective exercise looks back on projects that have already been constructed. The intention is to use this research to inform future projects and develop our understanding of our roles as architects. Part of this is to encourage a greater consideration of the resources within the vicinity of a project site, including the materials used and people involved. As well as considering the implications of the choices we make.

From an architects perspective the design and construction process is the main focus, however this only covers a very small portion of buildings total life span. Beginning this research with the construction process is a good starting point but it is also essential to look beyond this stage. To investigate the biography of a building it needs to be understood that they are not static products. That a building is not finalised once the design and construction is complete but they are in fact constantly evolving through use. From a design perspective we have to ask ourselves: how does the way a building is produced affect how it is perceived, by those who use it?

PROJECTS by MEDIOMUNDO arquitectos

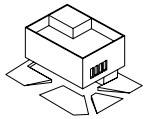


CIBERCENTRO

Sevilla 2009



type: Community Building
size: 410 m2
client: City Council of Seville
consultants/co-designers: MOG Architects
collaborators: Fabio Orizia Pérez, Raúl Elías Bramón, Silvia Casitas Montero, Ana López Ortego, Harold Guyaux

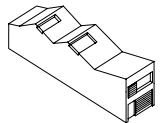


BIBLIOTECA CAÑADA ROSAL

Sevilla 2005-2009



type: Public Library
size: 200 m2
client: EPSA and the Council of Cañada Rosal
collaborators: Fabio Orizia Pérez

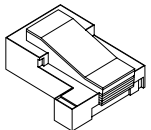


CINE-TEATRO SAN FRANCISCO

Cádiz 2001-2009



type: Re-building of Cinema and Theatre
size: 1333 m2
client: Ministry of Culture, Board of Andalucía, Cádiz CC
consultants/co-designers: Diego Brieva, Sitio Arquitectura (Gallo-Kossak-Pereira- Pérez)
collaborators: Javier Lindiman, Nicolás Pintos

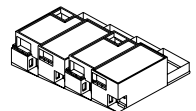


CONIL HOUSING

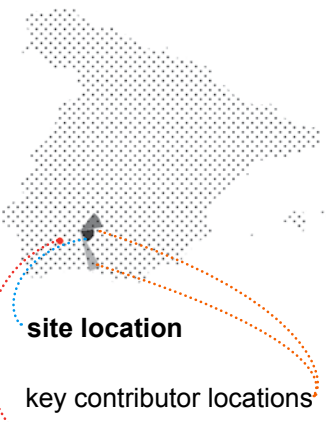
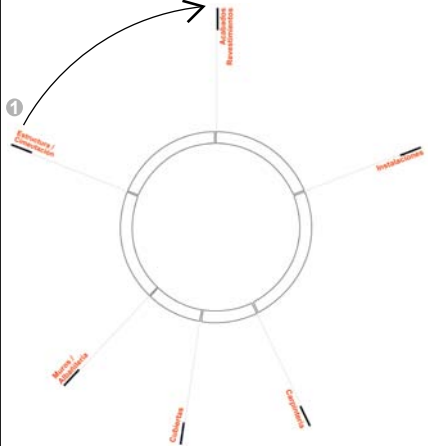
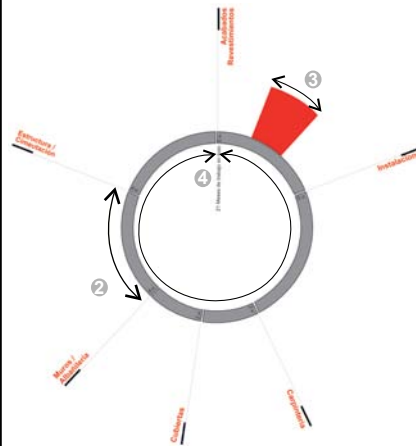
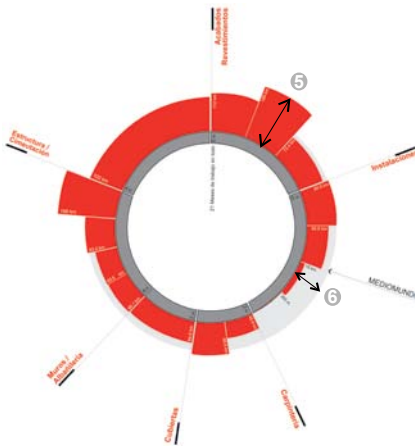
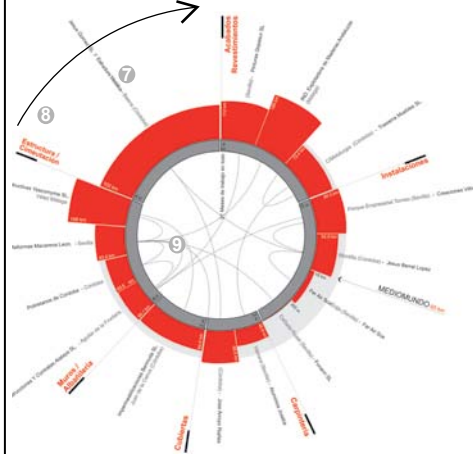
Cádiz 2004-2009



type: 32 Houses
size: 4500 m2 (whole site)
client: (ROSAM) Town Council of Conil de la Frontera
collaborators: Angélica Cortés Sanguino, Elias Pérez Lema, Fabio Orizia Pérez and Nicolás Pintos



>> EXPLORATION PARAMETERS

WHERE	WHAT	HOW	WHO
 <p>site location</p> <p>key contributor locations</p> <p>MEDIOMUNDO office location</p>	 <p>WHAT phase of construction:</p> <ul style="list-style-type: none"> groundwork's ① foundations / structure walls / partitions roof carpentry installations cladding / finishes 	 <p>② HOW long? (months) How long did each construction phase take to complete on site?</p> <p>③ HOW long did each contributor take on site? (approximately **)</p> <p>④ HOW long in total? What is the accumulative total of months worked on site?</p>  <p>⑤ HOW far? (km) Distance between the home location of each contributor to the project site.</p> <p>⑥ HOW far? (km) Distance between the offices of MEDIOMUNDO (design team) and the project site</p>	 <p>⑦ WHO were the contributors? Meaning all those involved in the realisation of the building</p> <p>⑧ WHO does what? To what stage of the construction does each contributor belong.</p> <p>⑨ WHO'S connected with who? What are the links between the different contributors?</p>

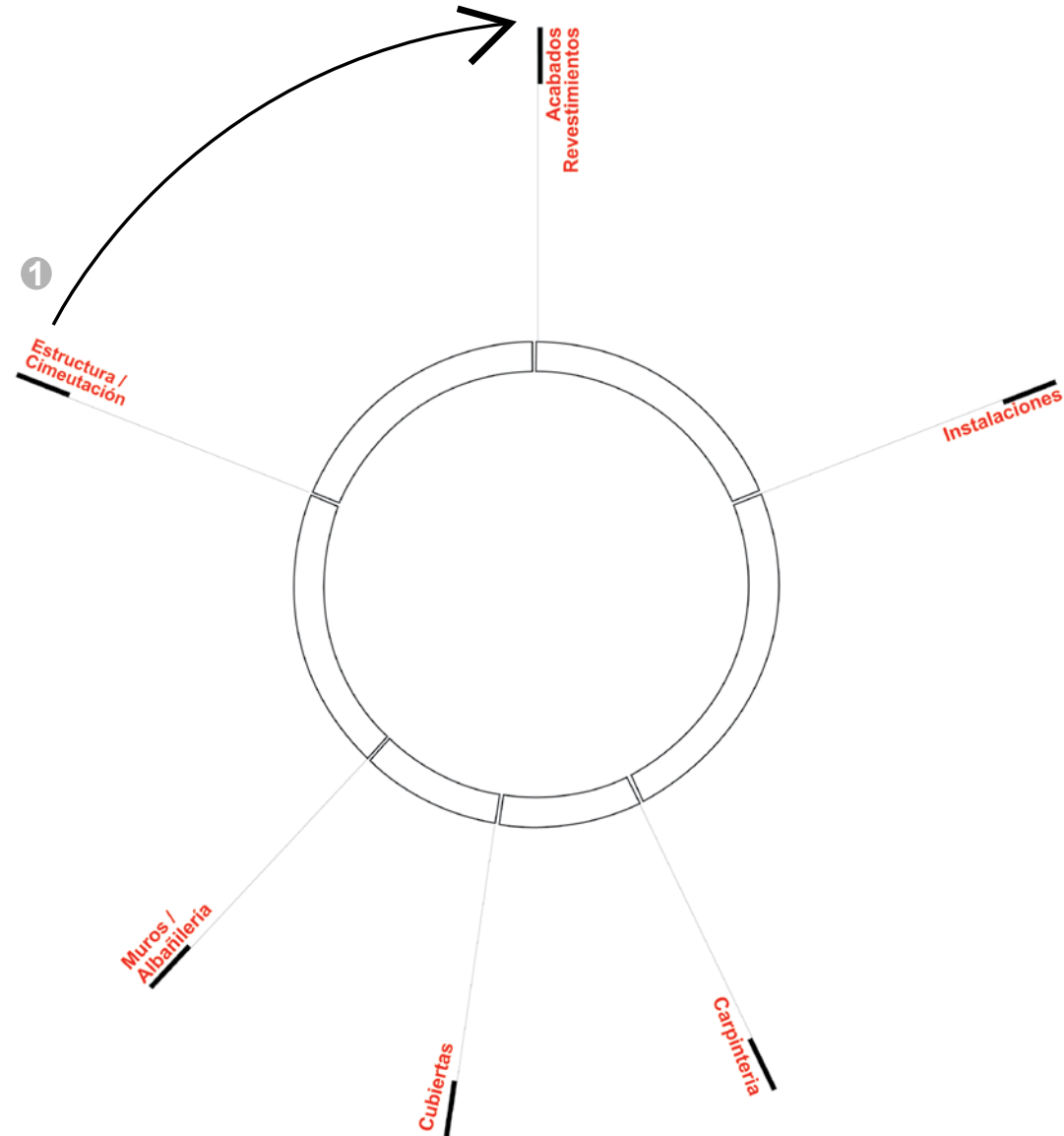
For each project we asked ourselves a series of questions, concerning the where, what, how and who relating to each project. In order to answer these questions we used the standard records from each project, as well as personal experiences. The above diagrams details the information that has been used and how they have been represented.

** The data used for this analysis does not include the specific length of time each contributor, individually spent working on site. The segment for each phase is divided equally by the number contributors involved.

WHAT

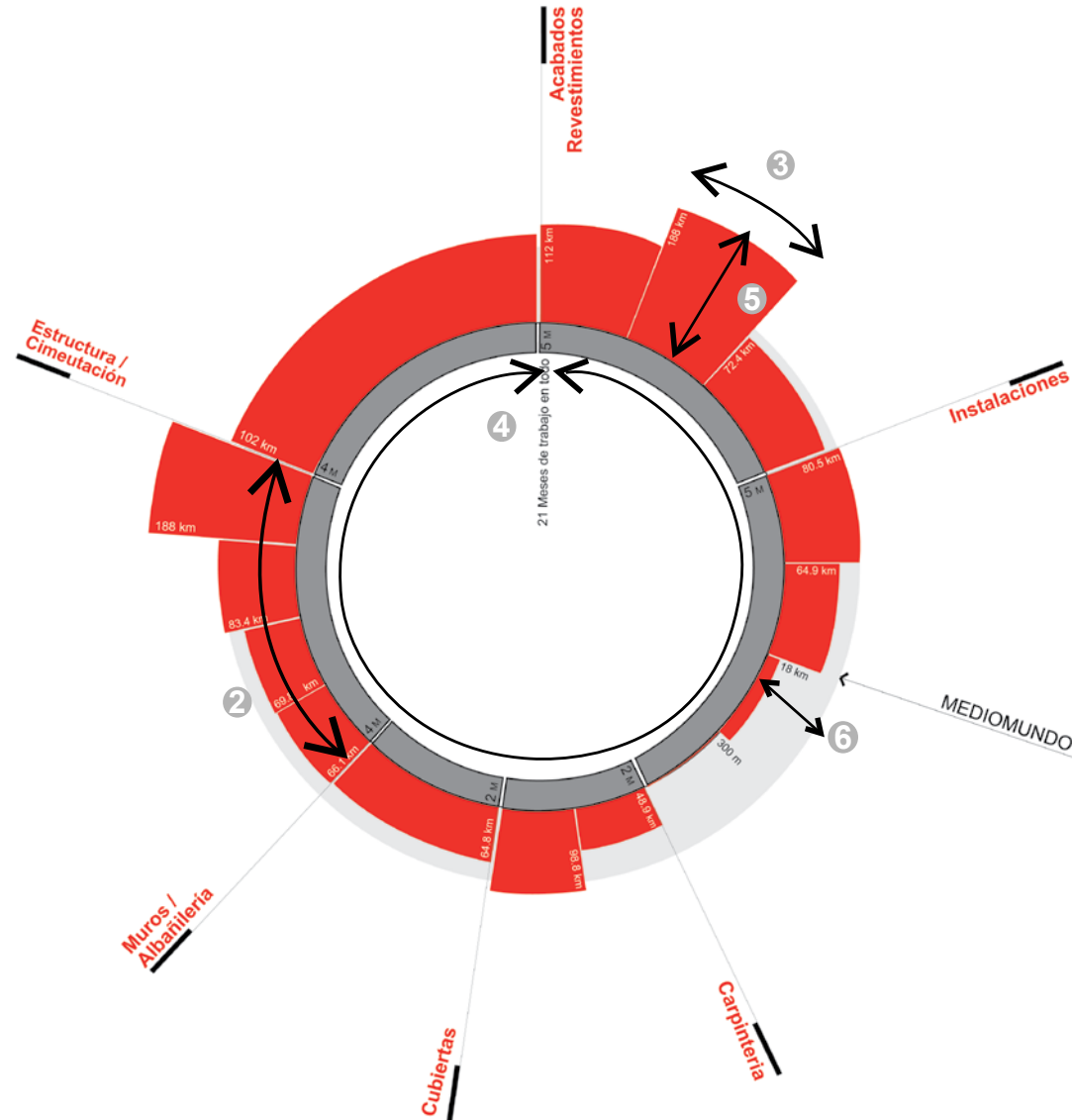
WHAT phase of construction:

- groundwork's
- ① foundations / structure
- walls / partitions
- roof
- carpentry
- installations
- cladding / finishes



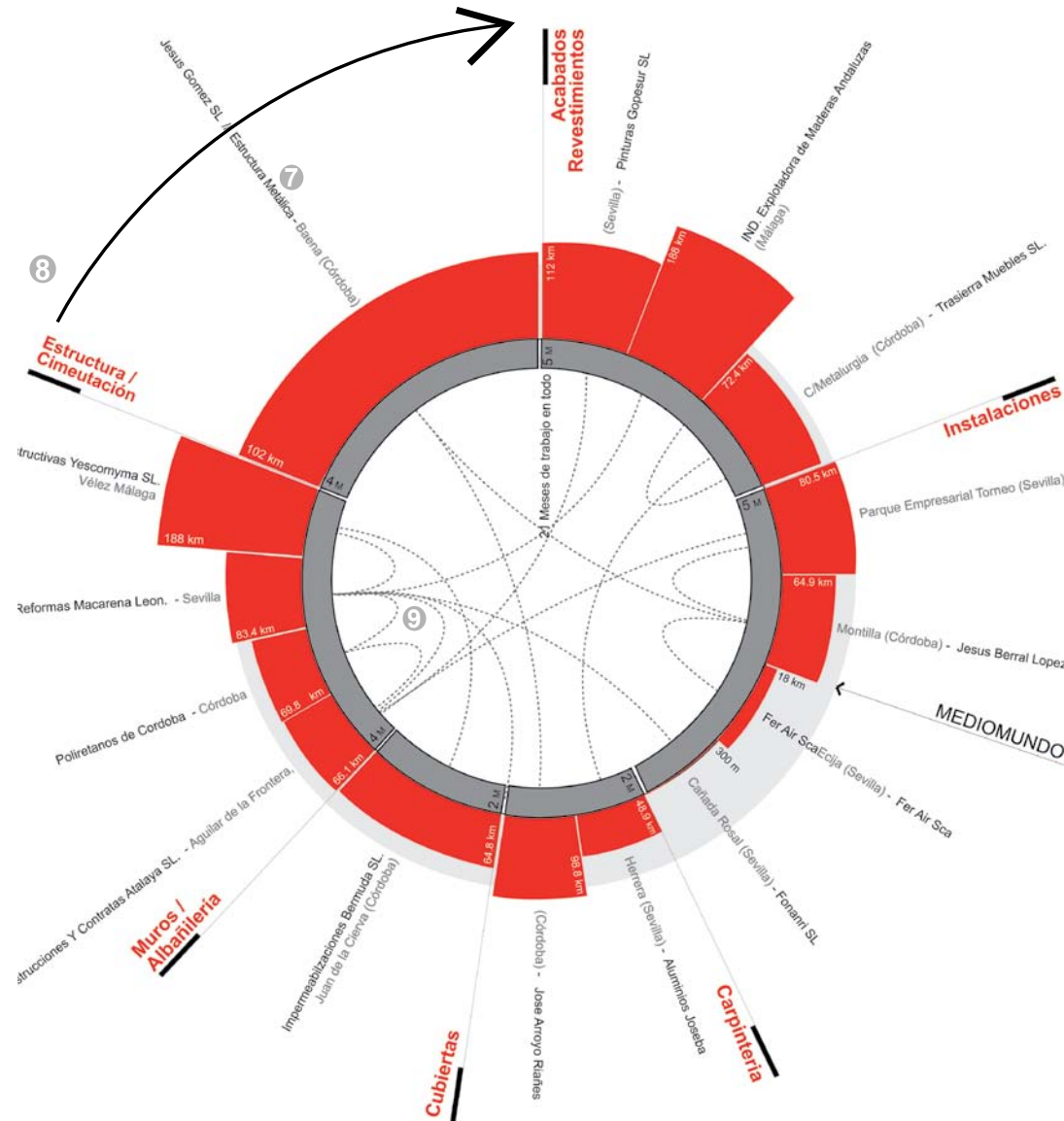
HOW

- ② **HOW long? (months)**
How long did each construction phase take to complete on site?
- ③ **HOW long** did each contributor take on site? (approximately **)
- ④ **HOW long in total?**
What is the accumulative total of months worked on site?
- ⑤ **HOW far? (km)**
Distance between the home location of each contributor to the project site.
- ⑥ **HOW far? (km)**
Distance between the offices of MEDIOMUNDO (design team) and the project site



WHO

- 7 **WHO were the contributors?**
Meaning all those involved in the realisation of the building
- 8 **WHO does what?**
To what stage of the construction does each contributor belong.
- 9 **WHO'S connected with who?**
What are the links between the different contributors?

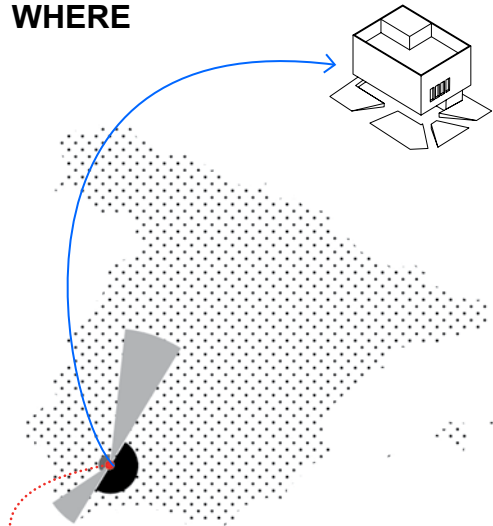


>> PROJECT EVALUATION: Where,

CIBERCENTRO

Sevilla 2009

WHERE



MEDIOMUNDO

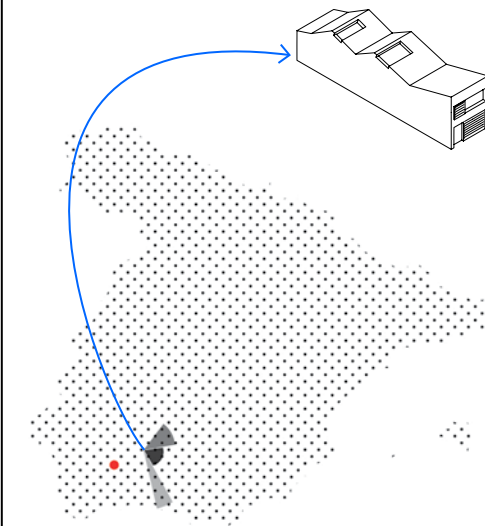
The project site is located on the outskirts of the city of Sevilla, 5.4km from MedioMundo's offices on Calle San Salvador in Sevilla.

28 contributors in total:

24 from Sevilla	(1-54 km)
2 from Cádiz	(77-94 km)
2 from Madrid	(533-544 km)

BIBLIOTECA

Cañada Rosal 2005-2009 (Sevilla)



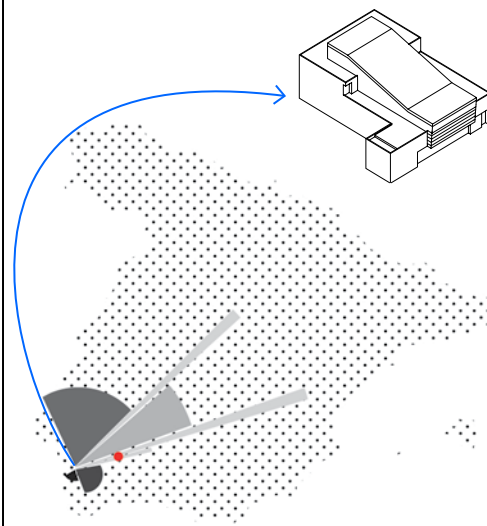
The project site is located in the small town of Cañada Rosal which lies between Sevilla and Cordoba, 85.8 km from MedioMundo's offices on Calle San Salvador in Sevilla.

15 contributors in total:

7 from Sevilla	(18 -112 km)
6 from Cordoba	(64-102 km)
2 from Malaga	(118 km)

CINE-TEATRO

Vejer de la Frontera 2001-2009 (Cádiz)



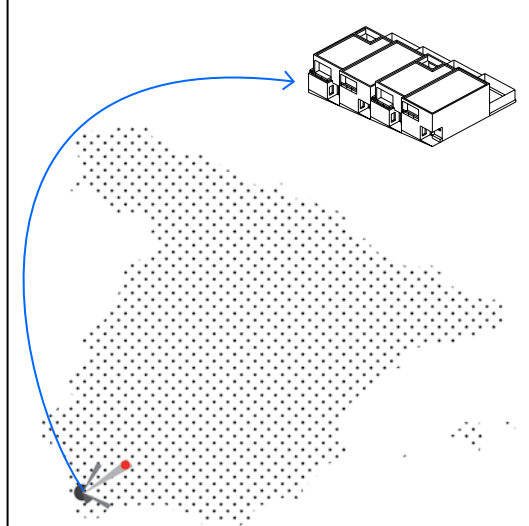
The project site is located in the small town of Vejer de la Frontera, South/East from Cádiz, 158 km from MedioMundo's offices on Calle San Salvador in Sevilla.

37 contributors in total:

20 from Cádiz	(1-69 km)
8 from Sevilla	(144-177 km)
2 from Madrid	(505-708 Km)
2 from Granada	(320 km)
1 from Malaga	(116 km)
1 from Navarra	(1109 km)
3 (other)	

CONIL HOUSING

Conil de la Frontera 2004-2009 (Cádiz)



The project site is located on the outskirts of the small town of Conil de la Frontera, South of Cádiz, 149 km from MedioMundo's offices in Sevilla.
































17 contributors in total:

8 from Conil	(1-12 km)
2 from Barbate	(24 Km)
1 from Arcos de la Frontera	(90 km)
1 from Chiclana	(27 km)
1 from Prado del Rey	(122 km)
1 from Benalup	(34 km)
1 from Fracinas	(68 km)

>> PROJECT EVALUATION: what, how , who....

PROJECT PHASE COMPARISON AVERAGE TRAVEL DISTANCE PER CONTRIBUTOR PER PHASE (km)

Achieved by taking the sum total of all the travel distances for each project phase, then dividing by the total number of contributors per project phase.

	GROUNDWORK'S	FOUNDATIONS / STRUCTURE	WALLS / PARTITIONS	ROOF	CARPENTRY	INSTALLATIONS	FINISHES / CLADDING
CIBERCENTRO 	199 	151 	47 	4.7 	33 	22 	32 
BIBLIOTECA 	—	102 	102 	65 	74 	41 	124 
CINE-TEATRO 	281 	47 	135 	320 	98 	91 	322 
HOUSING 	20 	14 	40 	86 	35 	21 	26 
SUM TOTAL	500	314	324	475.4	240	217	504

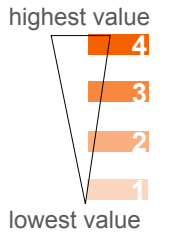


Diagram 2.

PROJECT COMPARISON

















	PROJECT SIZE (m2)	NUMBER OF CONTRIBUTORS	MONTHS OF WORK	TRAVEL DISTANCE (km)	AVERAGE DISTANCE PER CONTRIBUTOR	DISTANCE FOR MEDIOMUNDO
CIBERCENTRO 	410	28	45	1860 	66.4 	5.4 
BIBLIOTECA 	200	15	21	1258 	83.8 	85.8 
CINE-TEATRO 	1333	37	102	7150 	193 	158 
HOUSING 	4500	17	100	529 	31.1 	149 

Diagram 1.

Diagram 3.

>> COMMENTS: Project Overview

AVERAGE TRAVEL DISTANCE PER CONTRIBUTOR PER PROJECT (km)

Achieved by taking the sum total of all the travel distances for each project, then dividing by the total number of contributors per project.



Diagram 1.

highest value	CINE-TEATRO	193 km
	BIBLIOTECA	83.8 km
	CIBERCENTRO	66.4 km
lowest value	CONIL HOUSING	31.1 km

WHY? | There are many factors that can affect the average travel distance to site, such as the projects function, size, complexity and location.

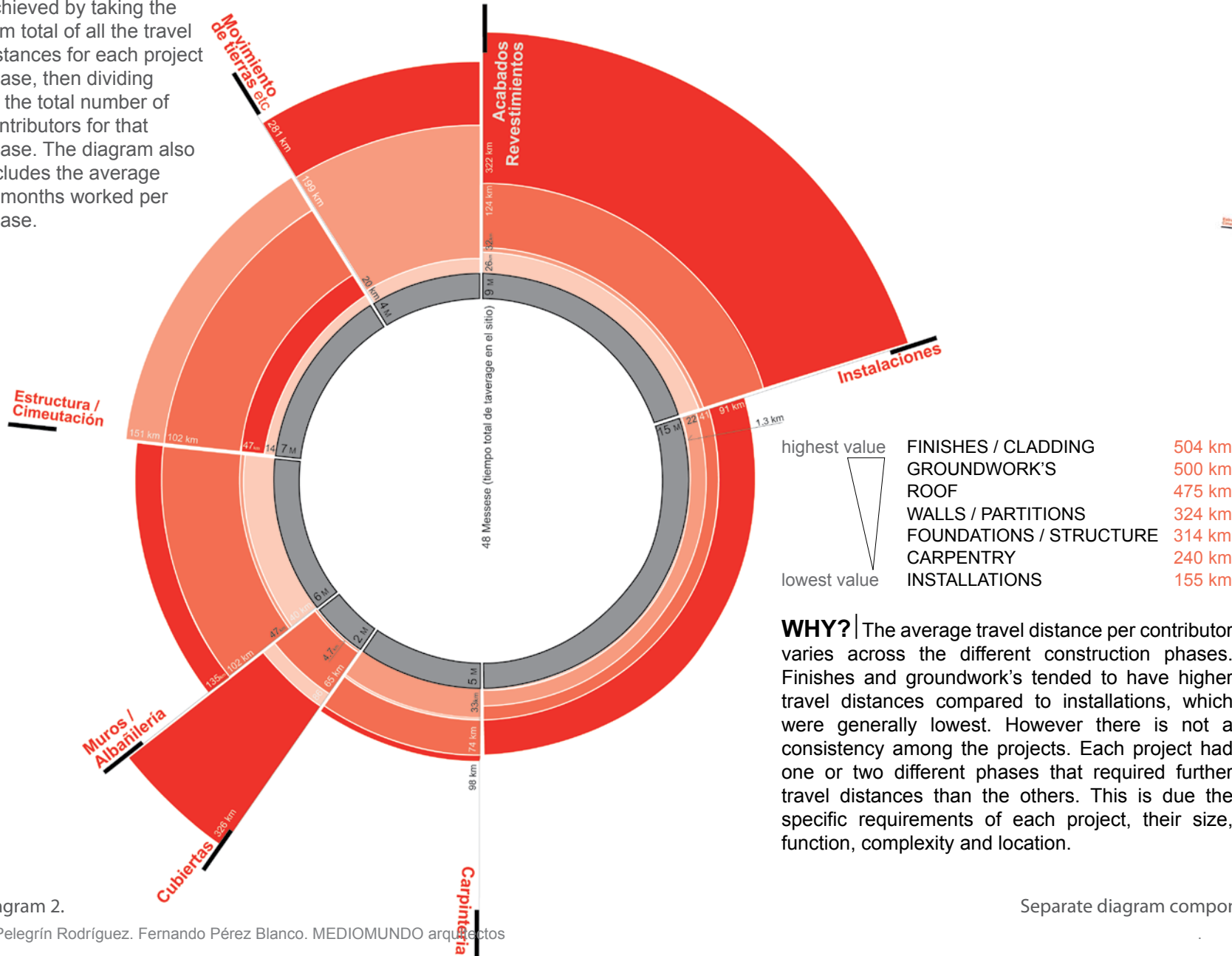
Here in diagram 1, the Cine-Teatro San Francisco has the longest average travel distance, it is also is the largest single building at 1333m² and most complex project of the four. The more remote location of the project site is also a contributing factor. To the credit of the project, 20 of the 37 contributors come from within 69 km, the distance to Cádiz, which is the nearest city. The other 17 contributors had to travel further, from other major cities such as Sevilla, Madrid and Granada, which range from 144 to 1100 km away.

At the other end of the scale, the 32 houses in Conil had the least average travel distance. The project has the largest total area but is the least complex of the four, consisting of repeated elements. The sites urban location is also a benefit as the materials and contactors requires could be found locally.

>> COMMENTS Project Overview

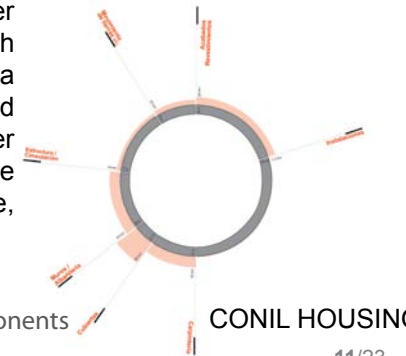
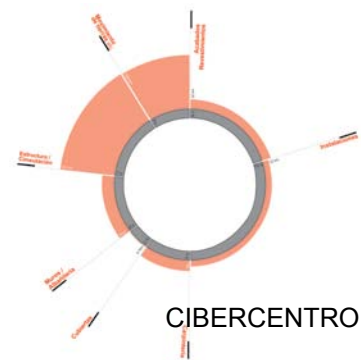
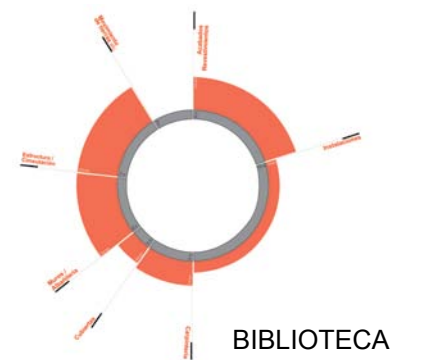
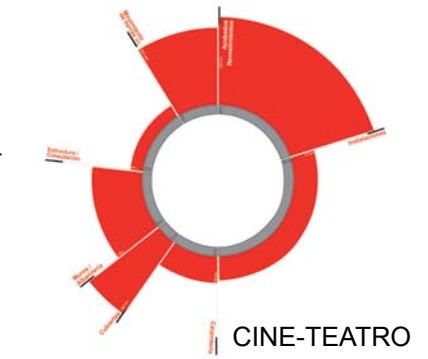
AVERAGE TRAVEL DISTANCE PER CONTRIBUTOR PER PHASE (km)

Achieved by taking the sum total of all the travel distances for each project phase, then dividing by the total number of contributors for that phase. The diagram also includes the average of months worked per phase.



highest value	Value (km)
FINISHES / CLADDING	504 km
GROUNDWORK'S	500 km
ROOF	475 km
WALLS / PARTITIONS	324 km
FOUNDATIONS / STRUCTURE	314 km
CARPENTRY	240 km
INSTALLATIONS	155 km
lowest value	

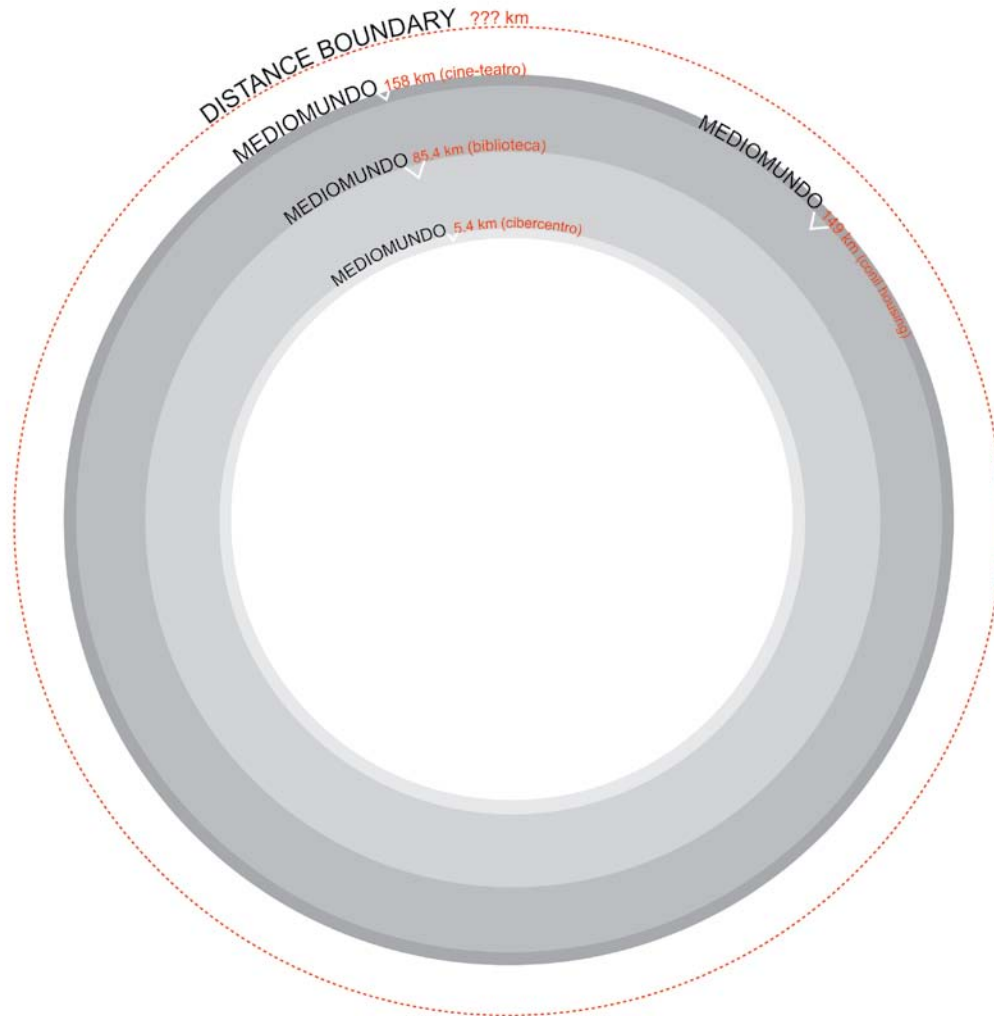
WHY? | The average travel distance per contributor varies across the different construction phases. Finishes and groundwork's tended to have higher travel distances compared to installations, which were generally lowest. However there is not a consistency among the projects. Each project had one or two different phases that required further travel distances than the others. This is due the specific requirements of each project, their size, function, complexity and location.



Separate diagram components

MEDIOMUNDO_TRAVEL DISTANCE TO SITE (km)

Distance between the offices of MEDIOMUNDO in Sevilla, to each of the project sites.



highest value	Project Site	Distance (km)
	CINE-TEATRO	158
	CONIL HOUSING	149
	BIBLIOTECA	85.4
lowest value	CIBERCENTRO	4.6

HOW | How far is too far to travel to site? This question is significant for any individual or company involved in the construction process. It is not a simple question nor does it have a single answer. From project to project the appropriate travel distances will vary when taking into account a sites restrictions and possibilities. What is important is to maintain a commitment to reduce the environmental impact of each project.

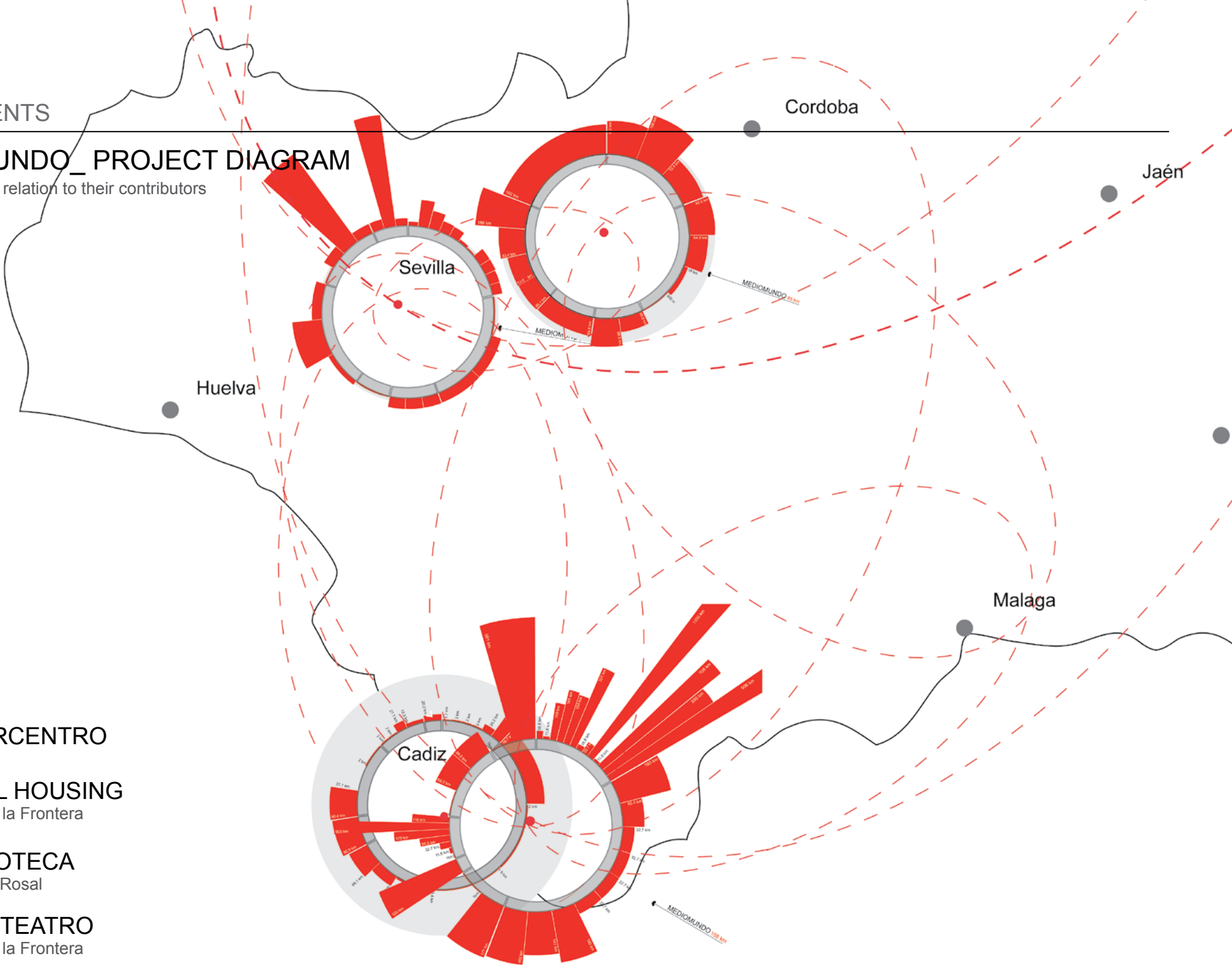
This research and method of analysing the construction process can be taken further by including the frequency of travel to site. To do this specific records would have to be kept during the construction phase or collated from existing data. Knowing the general frequency of travel for each construction phase or specific contributor would be extremely valuable as it would allow a design teams / developers to make more informed decisions about where to source materials and contractors from.

Diagram 3.

>> COMMENTS

MEDIOMUNDO_PROJECT DIAGRAM

Projects sites in relation to their contributors





Movimiento de tierras etc (A)

Geysermarkt, S.L.
Geotecnia y Cimientos, S.A.
Excavaciones Capitan, S.L.

Estructura / Cimentación (B)

Alicatacor S.L.
Productos Siderurgios Martin S.L.
Hierros y Ferrallas los Alcores, S.L. Aravaca
Hympsa (suministro de hormigon)

Muros / Albañilería (C)

Escayolas Hmos. Leon S.C. // Carton Yeso
Bovedillas Ceramicas Andaluzas S.L. // Ladrillos
Proyecor S.C. // Aislamientos

Cubiertas (D)

Impermeabilizaciones Porticor S.L.

Carpintería (E)

Crisalería Grande S.L.
Aluarte Los Alcores S.L.
Carpintería Metalica Barrera Roldan S.L.

Instalaciones (F)

Fontaneria Sanchez Algaba S.L.
Electricidad Plaza Las Flores S.L.
Creaciones Vilver S.L.

Revestimientos Acabados (G)

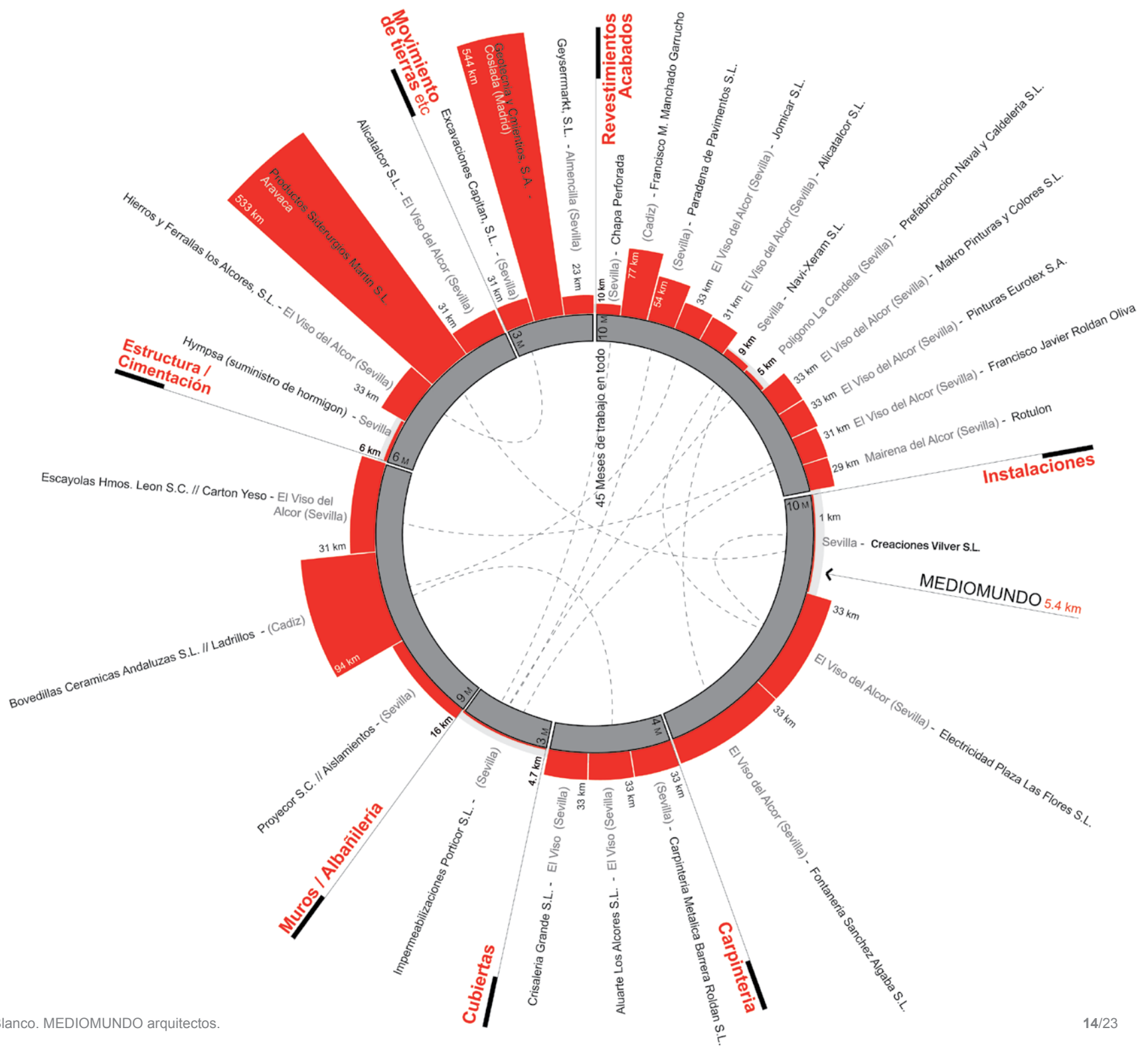
Rotulon
Francisco Javier Roldan Oliva
Pinturas Eurotex S.A.
Makro Pinturas y Colores S.L.
Prefabricacion Naval y Caldeleria S.L.
Navi-Xeram S.L.
Alicatacor S.L.
Jomicar S.L.
Paradena de Pavimentos S.L.
Francisco M. Manchado Garrucho
Chapa Perforada



CIBER-CENTRO

La Macarena de tres huertas

Marta Pelegrín Rodríguez. Fernando Pérez Blanco. MEDIOMUNDO arquitectos.





Estructura / Cimentación (B)
Jesus Gomez SL // Estructura Metálica

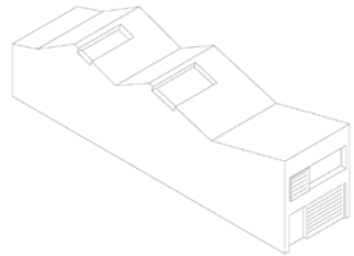
Muros / Albañilería (C)
Soluciones Constructivas Yescomyma SL
Construcciones Y Reformas Macarena Leon
Poliretanos de Cordoba
Construcciones Y Contratas Atalaya SL

Cubiertas (D)
Impermeabilizaciones Bermuda SL.

Carpintería (E)
Jose Arroyo Riañes
Aluminios Joseba

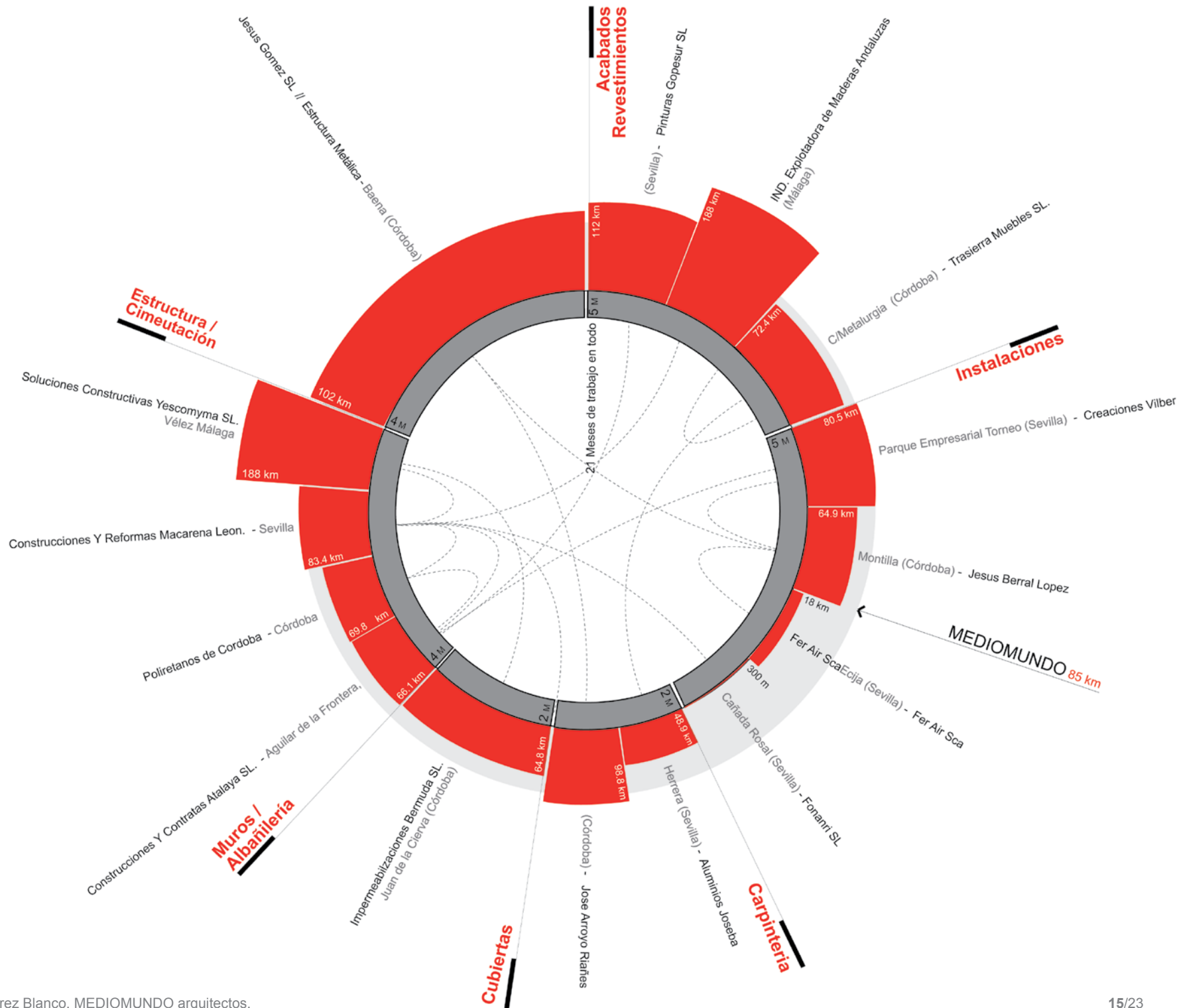
Instalaciones (F)
Fonanni SL
Fer Air Sca
Jesus Berral Lopez
Creaciones Vilber

Revestimientos Acabados (G)
Trasierra Muebles SL.
IND. Explotadora de Maderas Andaluzas
Pinturas Gopesur SL



Biblioteca Cañada Rosal
Sevilla

Marta Pelegrín Rodríguez. Fernando Pérez Blanco. MEDIOMUNDO arquitectos.





Movimiento de tierras etc (A)

Industrias Maquiescenic S.L.
Excavaciones La Muela, S.L.

Estructura / Cimentación (B)

Hormián, S.L.
Encofrados Sesán, S.L.
S.C.A. Armaduras de la Janda, S.L.

Muros / Albañilería (C)

Proymsur, S.C
STOC Acústica, S.A
INASEL, S.L
Juanjo, S.L.
Estructuras y Cubiertas Páez, S.L.
Big Mat Moreno, S.L.
Construcciones Cegil, S.C

Cubiertas (D)

Cubiertas SANI, S.L

Carpintería (E)

Francisco Márquez Jiménez // Carpintería
Carpisa Sur, S.L.

Instalaciones (F)

Sistemas de Energía Térmica, S.L.
ITEM de Andalucía, S.L.
Electrofil Andalucía, S.A.
Fontanería y Saneamientos EPI, S.L.
Ascensores Bahía, S.L.
Moneleg, S.L.
Elecom Chiclana, S.L.
Proinco saneamientos, S.L.
Mogasur, S.L.

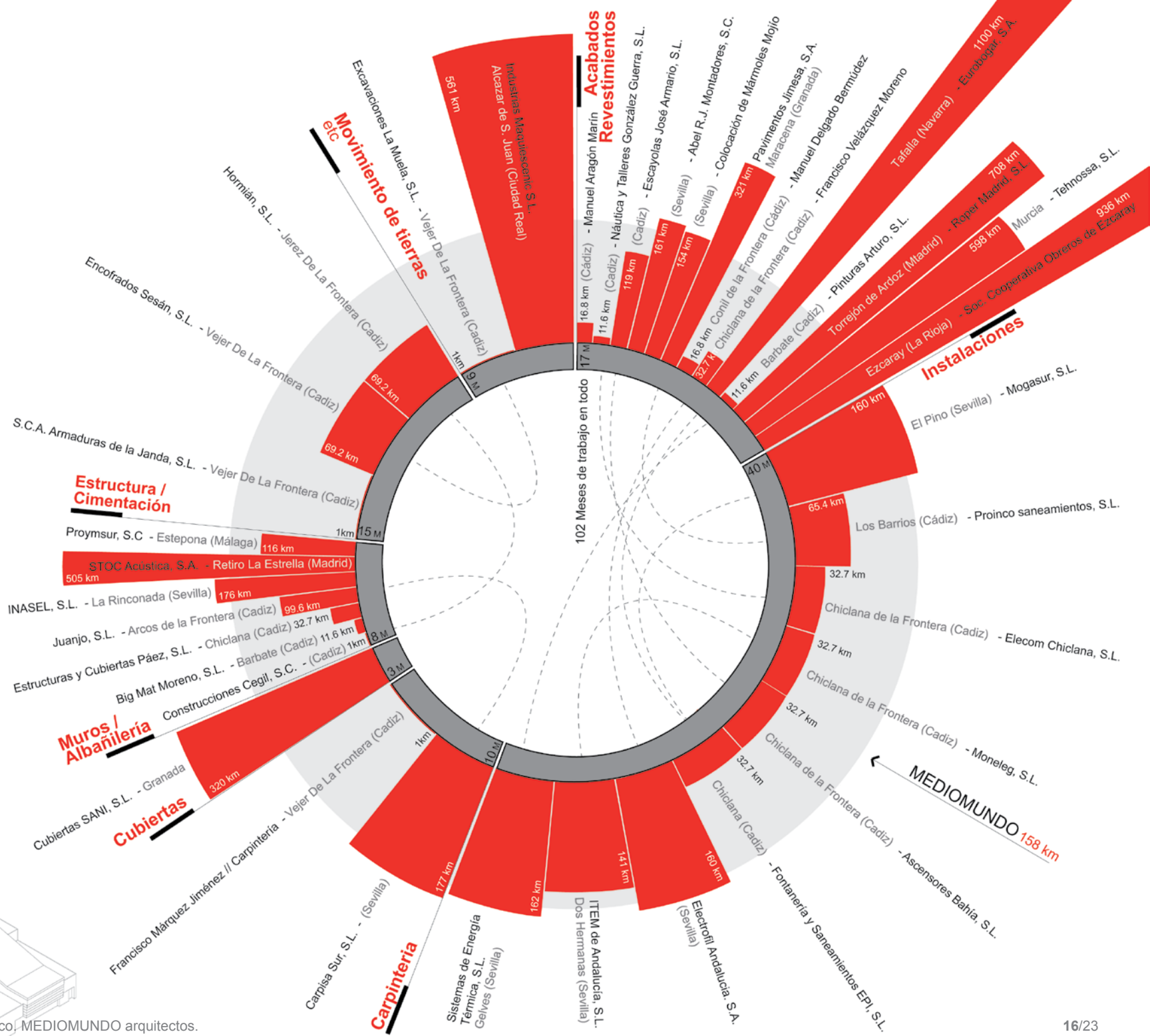
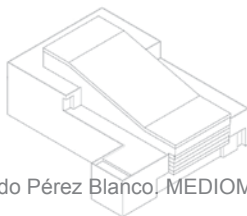
Revestimientos Acabados (G)

Soc. Cooperativa Obreros de Ezcaray
Tehnossa, S.L.
Roper Madrid, S.L.
Pinturas Arturo, S.L.
Eurobogar, S.A.
Francisco Velázquez Moreno
Manuel Delgado Bermúdez
Pavimentos Jimesa, S.A
Colocación de Mármoles Mojío
Abel R.J. Montadores, S.C.
Escayolas José Armario, S.L.
Náutica y Talleres González Guerra, S.L.
Manuel Aragón Marín

CINE-TEATRO SAN FRANCISCO

Vejer de la Frontera

Marta Pelegrín Rodríguez. Fernando Pérez Blanco. MEDIOMUNDO arquitectos.





Movimiento de tierras etc (A)

Gades Gestion

Estructura / Cimentación (B)

Hormigones la Janda
Vipren
Encofradores Cudrillas Locales
Big Mat Moreno

Muros / Albañilería (C)

Albañilería Cudrillas Locales
Vipren
Ceramicas

Cubiertas (D)

Sani impermeabilizaciones

Carpintería (E)

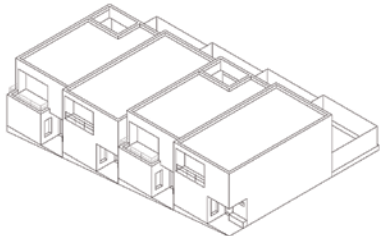
Carpintería Facinas
Deproalu
Cerrajería Vierga

Instalaciones (F)

Instalaciones Cifuentes
Fontanería Jose Sanchez Ortiz
Logi 'Otis'

Revestimientos Acabados (G)

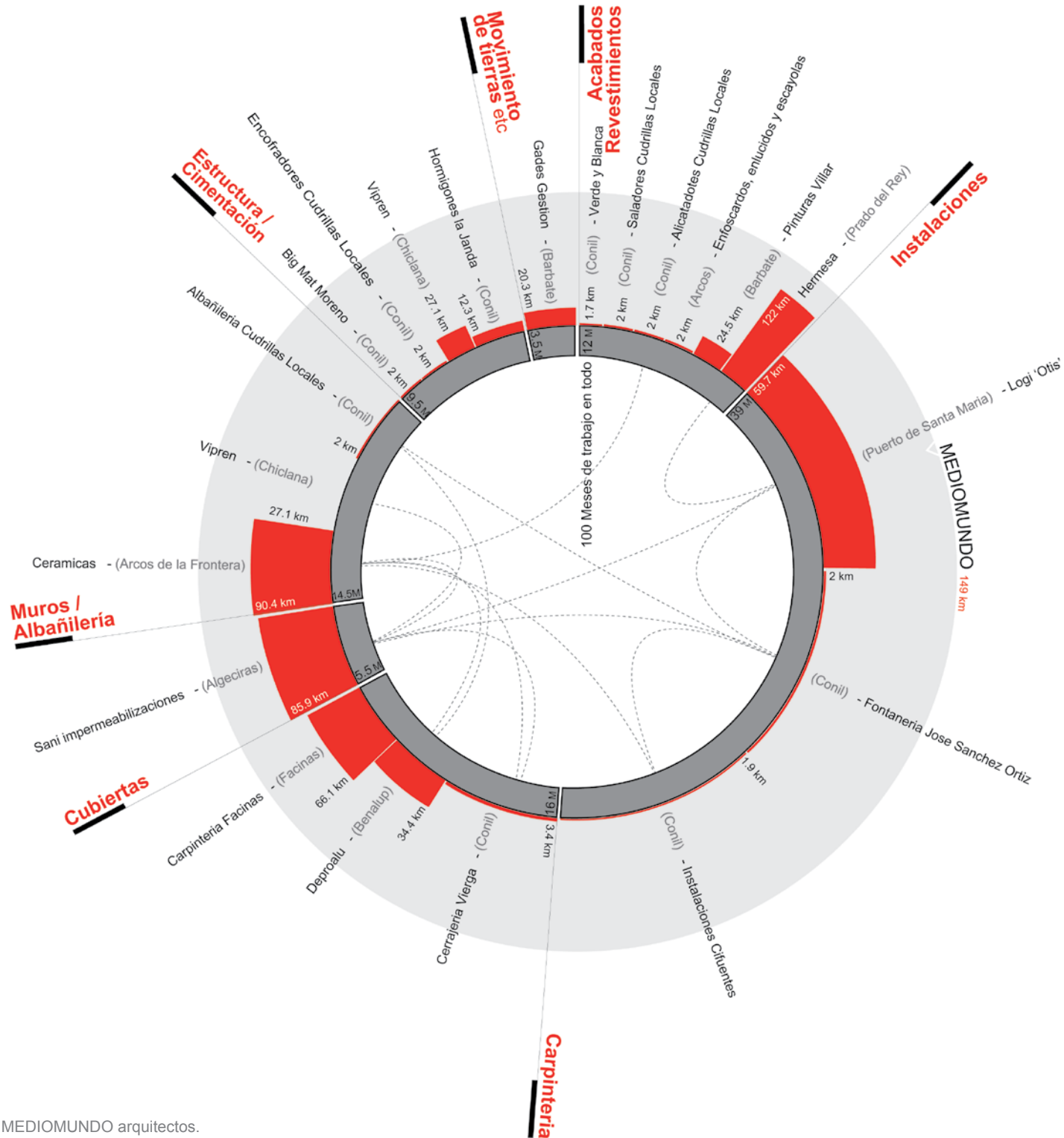
Hermesa
Pinturas Villar
Enfoscardos, enlucidos y escayolas
Alicatados Cudrillas Locales
Saladores Cudrillas Locales
Verde y Blanca



32 Viviendas, Conil de la Frontera

Cádiz

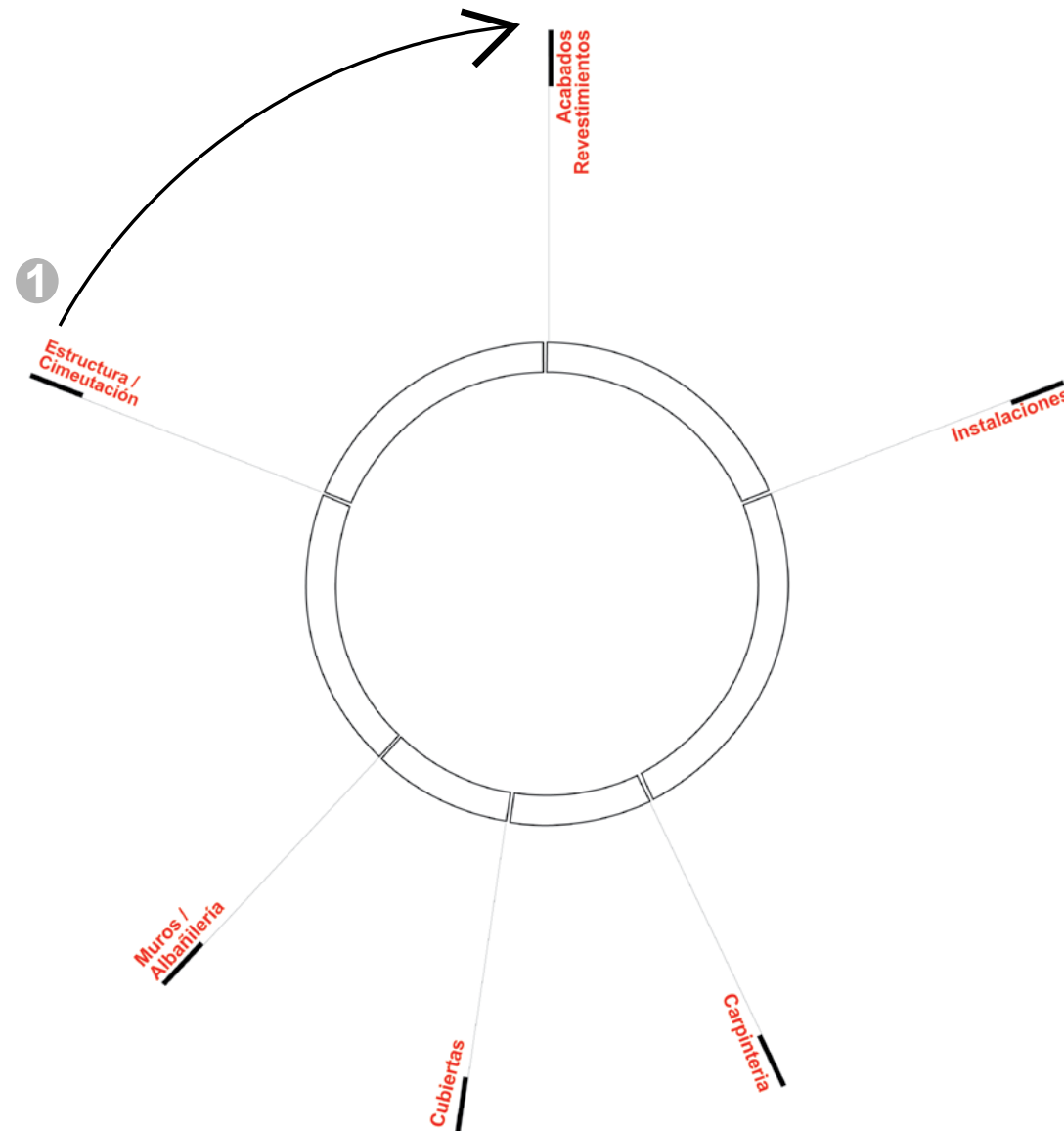
Marta Pelegrín Rodríguez. Fernando Pérez Blanco. MEDIOMUNDO arquitectos.



QUÉ

Capítulos de Obra:

- Movimientos de Tierra
- ① Cimentación / Estructura
- Muros / Albañilería
- Cubiertas
- Carpintería
- Instalaciones
- Revestimientos Acabados



TIEMPO / DISTANCIA

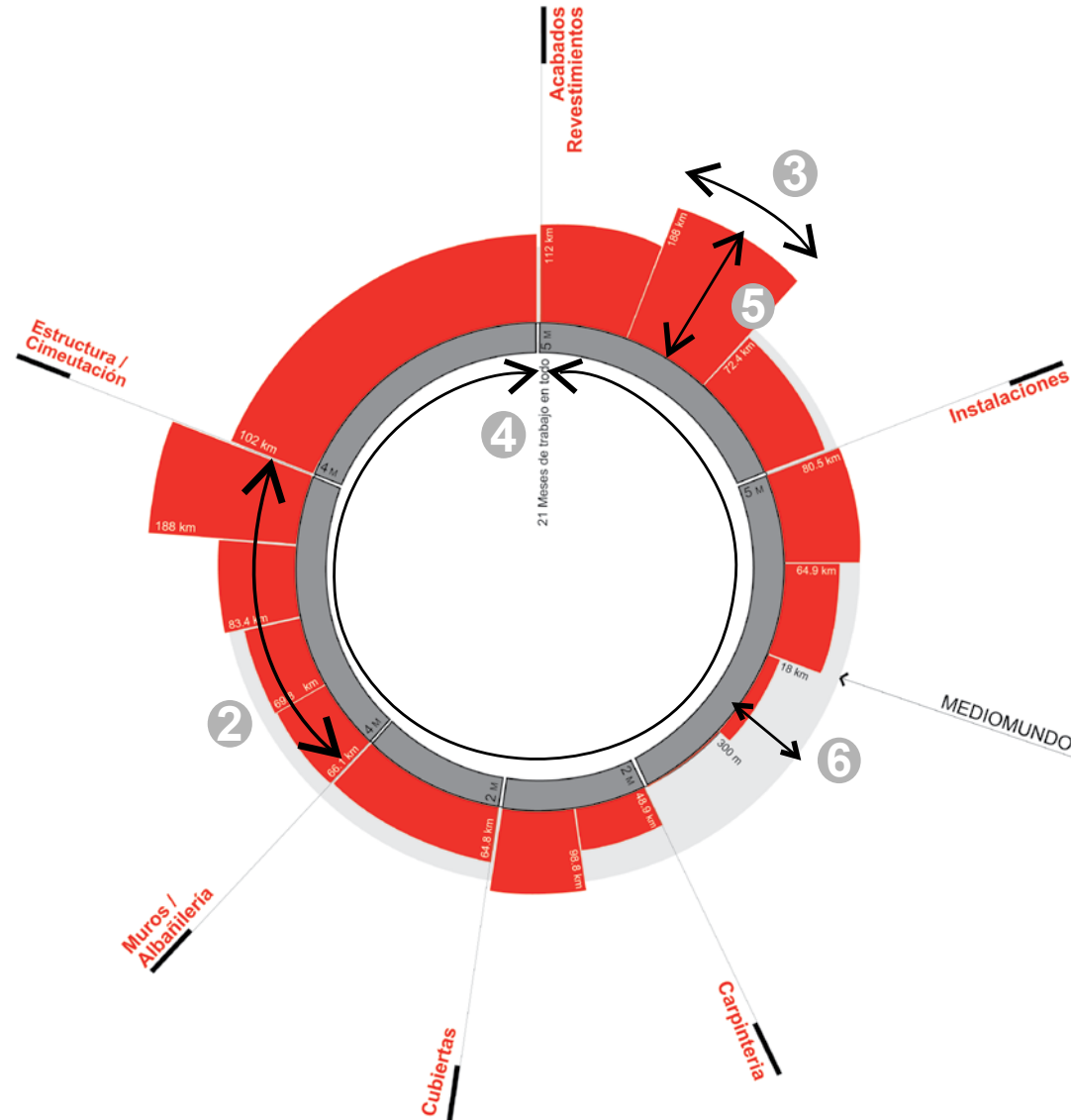
TIEMPO parcial (meses)

- ② ¿Cuánto tiempo de obra consumió cada capítulo?
- ③ ¿Cuánto tiempo de obra consumió cada agente?
- ④ ¿Cuánto tiempo duró la obra?

¿Qué Distancia?

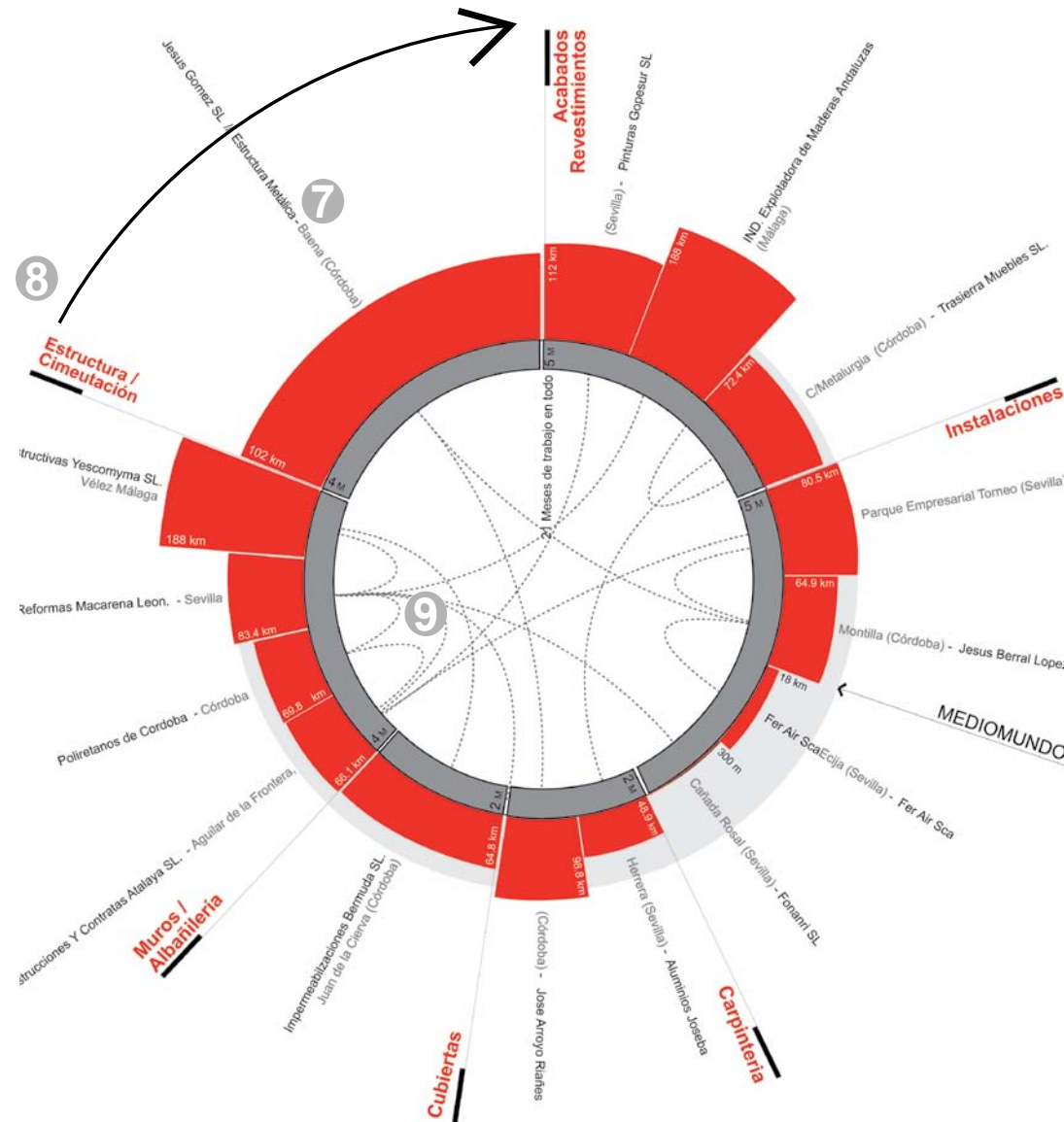
Distancia entre el origen de cada agente y la obra.

- ⑥ Distancia entre el origen de MEDIOMUNDO y la obra.



QUIÉNES

- 7 **¿Quiénes fueron los agentes?**
Nombrar todos los que participaron en cada capítulo.
- 8 **¿Quién hizo qué?**
¿Qué parte hizo o aportó cada uno?
- 9 **¿Quiénes se conocían?**
¿Qué relación tenían antes de la obra?
¿Qué relación mantuvieron durante la obra?



>> COMMENTS

MEDIOMUNDO_PROJECT DIAGRAM

Projects sites in relation to their contributors

